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DEPARTMENT OF AGRICULTURE

PROPAGATION OF NORTH CAROLINA FRUIT PLANTS

BY

H. HAROLD HUME AND F. C. REIMER.



TIP LAYER OF BLACK RASPBERRY SHOWING BUDS AND ROOTS.

JANUARY, 1906

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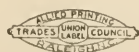
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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 1.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, JANUARY, 1906.

PROPAGATION OF NORTH CAROLINA FRUIT PLANTS.

BY H. HAROLD HUME AND F. C. REIMER.

INTRODUCTION.

The methods by which our common fruit trees, shrubs, or other plants are propagated, should be known to every one who is in any-wise interested in their culture. The methods are not difficult, and with some care, patience and practice may be put into use by almost any one.

In the following pages the methods commonly used in multiplying the different fruit plants grown in North Carolina are given. Only those which are believed to be of the most practical use and benefit are described.

The seedling fruit tree is a thing of the past. The reason for this lies in the fact that few or none of them are reproduced true to the parent plant by means of seed. This is largely due to the fact that the seed is formed as the result of the union of two parents. One of these is known, the other is not, and in the combination there comes the hereditary influence of a long chain of ancestors, all of which are probably unknown and the majority of which were inferior in size, quality and flavor of fruit. The only means by which we can be certain of getting what we plant is to set out plants in our gardens, orchards or plantations which have been propagated by cuttings, runners, layers, grafts or buds.

Every fruit grower should know the fundamental principles and practices which underlie the propagation of plants. He is then in a position to do propagation work for himself. This knowledge is frequently valuable. He may have a particularly desirable variety of fruit or a specimen of some one variety which has desirable characteristics above other trees of the same kind. He can propagate from that single specimen, thereby securing trees more desirable in every way and making his garden or orchard more remunerative and valuable.

TOOLS REQUIRED.

For work in propagating plants by the various methods the following tools are required: budding knife, grafting iron and mallet, pruning shears and saw, and a tool for annular or ring budding.

The budding knife (Fig. 1) should have a thin blade of well-



FIG. 1.—Budding Knife.

tempered steel, one that will retain a keen cutting edge. A whetstone should be kept close at hand and used frequently. All cuts must be smooth and clean. Such cuts cannot be made with a dull knife.

Two styles of grafting irons are illustrated (Figs. 2 and 3). Fig. 3

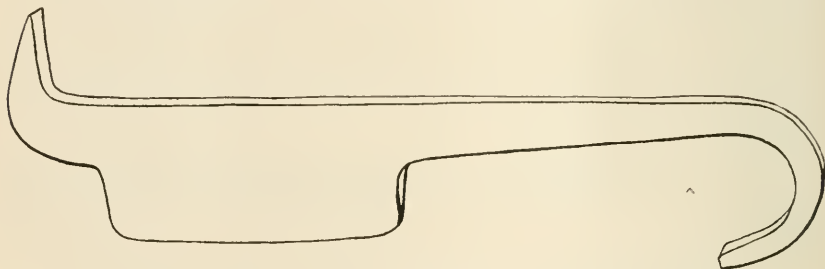


FIG. 2.—Grafting Iron.

is rather the best, as the inward curve of the blade helps to prevent unnecessary tearing of the bark. The mallet may be simply a moderately heavy billet of wood, or a regular small-sized carpenter's mallet will answer nicely.

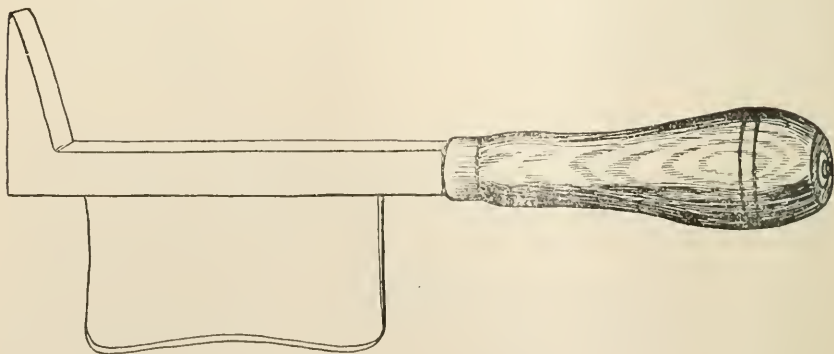


FIG. 3.—Another Style of Grafting Iron.

Pruning shears are very convenient and may be used in cutting scions from the trees, in the making of cuttings and in pruning out undesirable branches when top-working trees. Those illustrated in the accompanying figure (Fig. 4) are the best type of hand-shears.

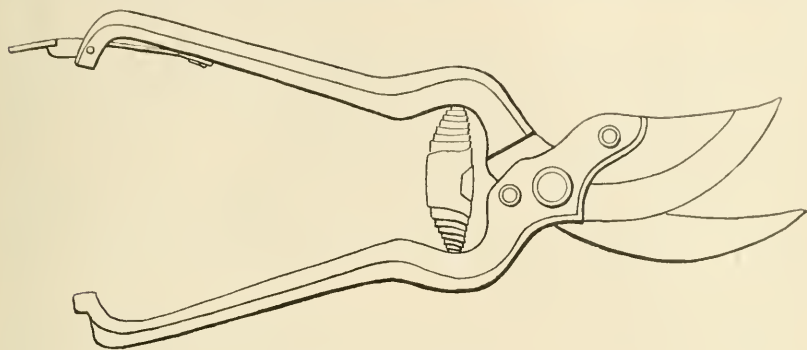


FIG. 4.—Pruning Shears.

For work in grafting, an ordinary fine-toothed pruning saw may be used. No saw will prove more satisfactory than the common back-saw used by carpenters for fine work. The teeth are small and a very smooth cut is left.

Annular or ring buds are very difficult to cut with a common budding knife so that they will fit. Two blades may be attached, parallel to each other, on a piece of wood an inch or so square. Several budding tools have been invented for cutting annular buds. A satisfactory one is illustrated in Fig. 5. The holes along the handle are used

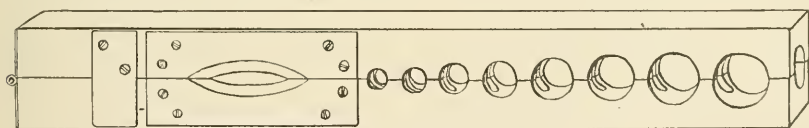


FIG. 5.—White's Budding Tool.

in measuring the diameter of the stock and bud-stick so as to select buds that will fit.

WAXES AND BANDAGES.

Grafting Wax.—Good grafting wax may be made from resin, beeswax and tallow or linseed oil. A large number of formulas have been used, but the following are good and may be taken as representative:

1. Resin, 6 pounds; beeswax, 2 pounds; linseed oil, 1 pint.
2. Resin, 4 pounds; beeswax, 2 pounds; tallow, 1 pound.

Melt the ingredients of either formula in an iron kettle over a slow fire. Stir as they melt to insure thorough mixing. Pour out into a bucket of cold water, grease the hands and pull until it becomes straw-colored. Wax not intended for immediate use may be rolled up in greased paper and put away. Grease the hands a little in using the wax.

Waxed Cloth.—Melt a sufficient amount of the wax in a kettle. Into it dip narrow sheets of old calico or cambric. As soon as saturated with the wax take them out, stretch and allow to cool. For use tear into strips about one-half inch wide.

Waxed Twine.—Melt the wax as above, and into it drop balls of No. 18 knitting cotton. Stir them about in the wax for about five minutes, by which time the wax will have penetrated them. Then take them out and allow them to cool. The twine will break easily without injuring the fingers.

Raphia.—Raphia, which may be purchased from dealers in horticultural supplies, makes a satisfactory wrapping for buds in many cases. It is a fiber obtained from a palm (*Raphia ruffia*). It should be moistened before using.

METHODS OF PROPAGATION.

Seeds for Stocks.—In most cases stocks used in propagating are grown from seed. The selection of this seed for stocks is of far more importance than is generally supposed. Ordinarily the seed is taken from pomace heaps at cider-mills, canning and evaporating factories and from worthless fruit which is allowed to decay. Such seed can never be expected to give good results. Often the fruit taken to cider-mills is of the poorest kind and represents all the varieties in the orchard—good and poor. In fact, the results on such roots are not often considered. It does not seem to make much difference with many people what kind of stocks are used, just so the tree has a root of some kind. If the best results are expected the seed should be taken from varieties or trees of known qualities, as hardiness, resistance to disease, insects, etc. It is known, for instance, that some varieties are hardier, longer-lived, more rapid growers and less subject to some diseases and insects than other varieties; also that some varieties often do far better on one kind of soil than on another. These things should be taken into consideration in propagating trees. Study the conditions under which the trees are to be grown, and select seed for stocks accordingly.

ALWAYS USE FRESH SEED.

Always select seed from well-matured fruits. No healthy, vigorous trees can be expected from immature seed. Such seed produces stunted and devitalized trees.

The fruit is mashed or allowed to decay and the seed is then washed from the pulpy mass and thoroughly cleaned. If it is desired to store it for some time before planting, it should first be well dried.

The peach, plum, cherry and pecan seeds have thick and hard seed-cases. Such seed requires special treatment, so as to give the little plantlet a chance to get out of the seed-coat. In this State the best method undoubtedly is to stratify the seed. This consists in placing the seed in layers in a box and alternating each layer with a layer of sand. These boxes are buried in moist, well-drained soil, and deep enough so that the box will be at least six inches below the surface of the ground. It is generally best to bury boxes on the north side of a building. It is also well to cover the surface of the soil with moss, leaf mould or straw, so as to keep the soil moist. By the following spring the seed-coats will be soft, so that the little plant can readily emerge when planted in the seed-bed. Inexperienced growers have often planted these thick-shelled seeds in the field without any treatment, but the result in most cases has been failure. Drainage, moisture, rodents, etc., are not under sufficient control in a large field to allow such practice. Although this practice is especially necessary for nuts and the thicker-shelled seeds, yet it is often practiced to advantage with the smaller and softer-shelled seeds, like apples, etc.

It should be emphasized that with nuts it is especially important that the seed be fresh when planted. The following spring the seed should be planted in a seed-bed or nursery row. There the plants can be better cared for. The soil in the seed-bed need not necessarily be very rich, but it should be mellow, moist and well drained. The seed can be put from three to six inches apart in the row, and two to three feet between the rows. It should be well cultivated, and hoed if necessary, to keep the soil moist, mellow and free from weeds. The age at which to bud or graft onto the stocks depends entirely on the kind of plant, and will be discussed under each fruit later on.

Although the growing of seedling trees is never admissible for orchard purposes, it is of great importance in the origination of new varieties. We know, for example, that no seedling tree is like its parent. In the varieties that have been cultivated for many years the seedling sometimes resembles the parent quite closely. For example, English walnuts, honey peach, and Hill's Chili strain of peaches. But where this is true of one variety there are hundreds of varieties of which it is not true. So it is a waste of time and money

to plant seedlings unless one desires something different from the variety or seedling from which the seed is selected. But in such a case the resulting trees are inferior to the parent variety in nearly every instance. It is only an accidental tree in many thousands of seedlings that proves equal or superior to the parent plant. If one wishes to grow seedlings for this purpose, and is willing to sacrifice many trees so that one improved or worthy new variety may be obtained, the practice is to be recommended. In fact, most of our varieties are the result of seedlings, and great improvement can be made with all of our fruits in this way. This practice is distinct, however, from commercial orcharding.

PROPAGATION BY DIVISION.

Runners.—Some plants propagate readily from runners. In most cases this is done without the aid of man. The old or parent plant sends out long, slender shoots above the ground, which will form roots and a little plant at some of the nodes. The little plant receives nourishment from the parent until its own roots become fixed, and they remain attached to each other until the runner decays or is cut. The strawberry is a good example. Some runners form only one bud,

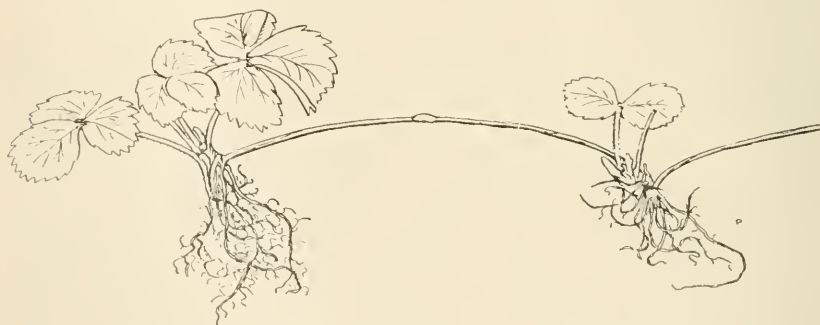


FIG. 6.—Strawberry Plant, Showing Parent Plant, Runner and Young Plant.

while others will form several. Although these buds will naturally take root in many cases, far better results will be obtained if they are properly cared for. The ground should be mellow and moist, so that the roots from the buds can enter. Sometimes the runners are not close to the ground and not enough moisture reaches the bud to form roots. This can be overcome by placing a little dirt on the runner near each bud. Fig. 6 shows runner and plants of strawberry.

These runners form during the entire growing season. After midsummer they can be taken up and planted, but usually they are left until the following spring. If one desires large, vigorous plants, much can be gained by preventing the little plant from fruiting by cutting off the flowers. If one can secure plants from genuine pedigree stock, much can be gained. These plants are true to name and are larger and generally more vigorous than plants that have received no special treatment.

SUCKERS.

Some plants send up a large number of plants from their roots or underground stems. These plants are known as suckers. The red raspberry is a good example (Fig. 7). These plants are taken up at almost any season of the year and planted. They can be removed during the summer while the sucker is in a growing condition, or in late fall, or early spring, while it is practically dormant. If taken up in the fall they can either be planted immediately or heeled in until the following spring.

In digging the plants one should be careful to leave intact a portion of the root from which the sucker grew. The plants should be carefully taken up with a spade, so as not to destroy the roots.

LAYERS.

Mound Layering.—This method is practiced with some of the brambles and with many shrubs. It consists in cutting back the parent plants. These are then hilled or mounded up (Fig. 8). They will throw up a large number of shoots which will form roots at the nodes in the soil. They can then be taken up and each shoot will make a plant.

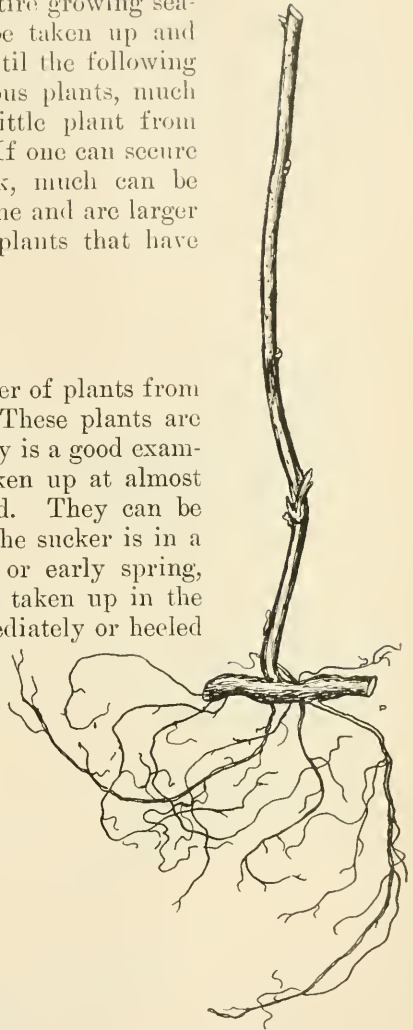


FIG. 7.—Red Raspberry Sucker,
Trimmed Ready for Planting.

Tip Layering.—Many plants form long, slender shoots which will take root at the tip. Some plants naturally root in this way, but far more plants can be secured and the process hastened by bending each tip down to the ground and covering with earth. These tips soon form roots (Fig. 9). The stolon can then be cut to a length of six to twelve inches. Each rooted tip will then form an individual plant and can be taken up and planted when desired.

Serpentine Layering.— This method of propagation is very much like the preceding one. But instead of making one plant

from each shoot, several are made. The method is practiced with plants producing long shoots like vines. The vine (Fig. 10) is laid on the ground and covered at intervals of one foot with dirt, or the whole vine may be covered. Roots and shoots will form at intervals. As soon as these plants are well formed, the vine can be separated into as many plants as there are shoots.

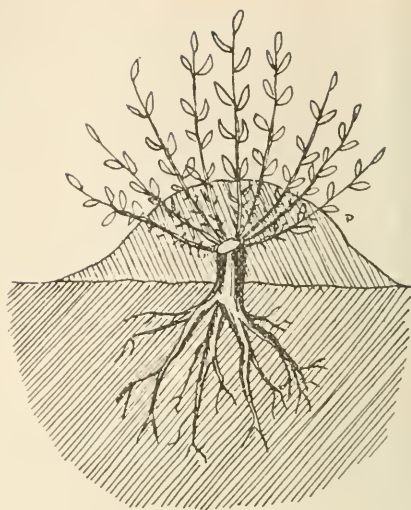


FIG. 8.—Mound Layer
(after Barry).



FIG. 9.—Rooted Tip Layer of Blackcap Raspberry.

CUTTINGS.

Root Cuttings.—Many plants are propagated by root cuttings. A root is cut into pieces three or four inches long, and these are then placed in shallow trenches, like seed in a nursery row. Each piece of root will form a plant (Fig. 11).

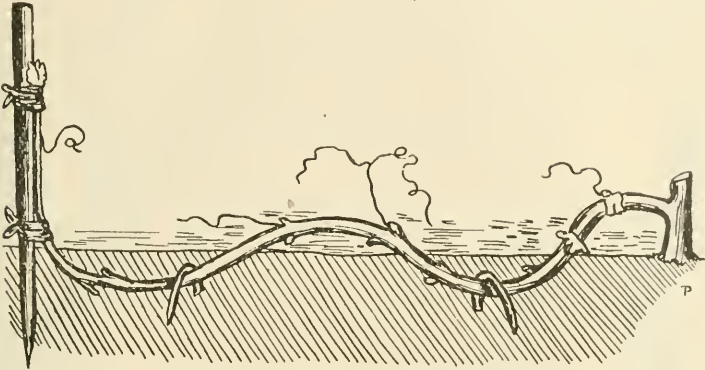


FIG. 10.—Serpentine Layer
(after Barry).

Stem Cutting.—A great many of our plants are readily propagated by stem cuttings. This is one of the easiest and quickest ways of propagating plants. Several methods of making stem cuttings are in vogue. The *simple cutting* (Fig. 12) is the one most commonly practiced. It consists of a straight piece of branch having several buds. A bud should be near the lower end. These are generally made in the fall of half-ripened or well-ripened wood. They should be tied in bundles of about fifty cuttings and placed in sawdust or sand in some cool place, preferably a cellar.

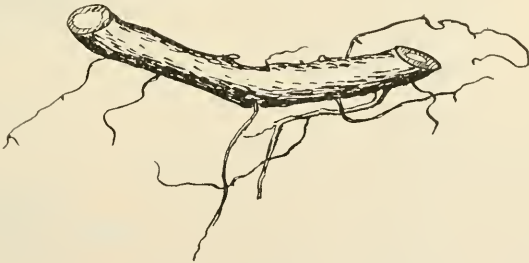


FIG. 11.—Root Cutting of Blackberry.

A *heel cutting* is like a simple cutting with a small portion of the parent branch attached, which forms the "heel." Fig. 13a shows a heel cutting of a grape. This cutting is more apt to form roots than the simple cutting.

The *mallet cutting* is mallet or T-shaped. A portion, several inches long, of the parent branch is left attached to the shoot. Fig. 13b illustrates a mallet cutting of grape. It has the same advantage the heel cutting has.

A *single-eye cutting* (Fig. 14) is sometimes employed with very rare varieties, when one wishes to increase them as rapidly as possible. It consists of a short piece of the shoot containing one bud or "eye." A smaller proportion of these live than in the other kinds of cuttings. They should receive special attention—a hot-bed or green-house bench with bottom heat are best. The buds are covered with about one-half to one inch of soil.



FIG. 12.—Simple Cutting of Fig.

BUDDING.

Shield Budding.—This is the method most commonly employed. It consists in making a T-shaped cut (Fig. 15 [1]) in the bark of the young tree. Then a bud is cut from bud-wood with a small portion of bark attached, making it shield-shaped (Fig. 15 [2]). This is inserted in the T-shaped opening in the stock (Fig. 15 [3]). The bud is then wrapped with waxed cloth to hold it in place. The work should be done when there is a strong flow of sap, as in May or June. Care should

be exercised in handling the bud and bud-wood. The bud should not be injured in handling. The bud-wood should be kept moist by wrapping in wet cloth. The cloth should be removed as soon as the bud has united well with the stock, which takes from one to two weeks. At the same time the stock should be cut and lopped just above the inserted bud, leaving about one-third the stock in contact for several weeks. This is not such a great shock as when the whole top is removed at once, and it helps to nourish the bud for some time.

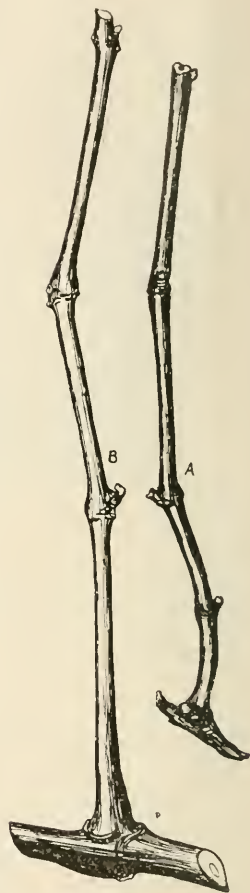


FIG. 13.—A. Heel Cutting. B. Mallet Cutting.



FIG. 14.—Single-eye Cutting of Grape.

PATCH AND RING BUDDING.

Some of our trees have such thick bark that it is impossible to bud them successfully by the shield-bud method. In such cases patch or ring budding is practiced.

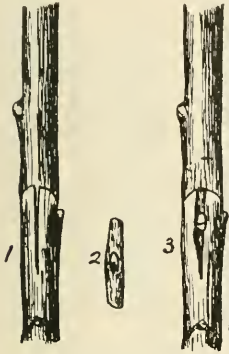


FIG. 15.—SHIELD BUDDING.
1. T-shaped Cut in Stock.
2. Bud Cut.
3. Bud Inserted Ready for Tying.

Patch budding (Fig. 17) consists in cutting a rectangular patch out of the bark of the stock and inserting a piece of the same size (Fig. 17 [1]) and shape from the scion. The work must be carefully done, so that the bark at each end of the patch is in contact with the bark of the stock. The success of the operation depends on this. The bud is then wrapped well with raphia or waxed cloth (Fig. 17 [2]). Sometimes the patch is made triangular in shape instead of rectangular.

Annular or Ring budding (Fig. 18) consists in removing a ring of bark from the stock (Fig. 18 [2]) and inserting a similar ring from the scion (Fig. 18 [1]). The ring should be at least one-half inch long. The scion at the joint where the ring is removed should be practically of the same diameter as the stock where the bud is to be inserted. The bud is then wrapped as in patch budding (Fig. 18 [3]).

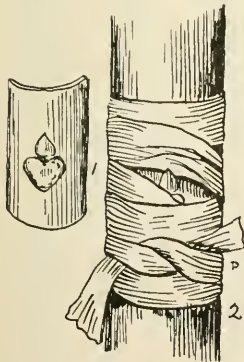


FIG. 17.—PATCH BUDDING.
1. Bud Cut Ready for Inserting.
2. Bud Inserted and Tied.

Many of our trees cannot be budded very successfully, but can be grafted. This is the best way to propagate such plants. In grafting, the part which is to be grafted onto is known as the *stock*, while the part that is placed on the stock is known as the *scion*, or *graft*. We may graft on the root of a plant, which is known as root-grafting, or at the crown of the plant, known as crown-grafting, or on the branches, which is known as top-grafting.



FIG. 16.—Bud Stick of Plum with some of the Buds Partially Removed.

Whip-grafting is the method of grafting performed on small stock, as in the nursery. It is best done with stock and scion not more than

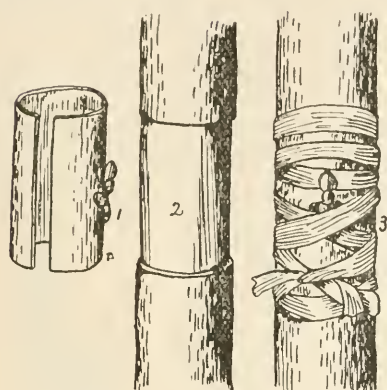


FIG. 18.—ANNULAR OR RING BUDDING.

1. Bud Cut.
2. Stock Ready for Bud.
3. Bud in Place and Wrapped.

one-half inch in diameter. The upper end of the stock is cut obliquely, so that the cut will be from three-fourths to one inch long. A cut is then made into the upper end of the stock, so as to form a "tongue" (Fig. 19 [2]). The lower end of the scion is cut in a similar fashion (Fig. 19 [1]). The tongue of the scion is then pushed into the cleft of the stock, so that the cambium layer of both will be in contact (Fig. 19 [3]). The union is wrapped firmly with grafting cord.

In explaining whip-grafting it



FIG. 19.—WHIP GRAFTING OF PERSIMMON.

1. Scion Properly Prepared.
2. Stock Prepared.
3. Scion and Stock Placed Together Ready for Wrapping.

is often recommended that in preparing the stock and the scion that they be "split." This is not necessary; it is sufficient if a small incision or cut is made into stock and scion. This will bring enough cambium together and will hold the scion in place. It will also obviate the unnecessary deep cleft or split, which may be of injury to the union. The scion should be at least four inches long and contain not less than two buds.

Whip-grafting is much practiced in root-grafting. In this method a whole root or piece of root is used for stock. In case only a piece is used it should be not less than four inches long. It is simply to give the scion a temporary root system. The scion will soon strike roots of its own, which is the object sought. It is of great importance where a stock of known merits is desired. For example, a very hardy variety, or one resistant to diseases and insects, could be established on its own roots.

Root-grafting should be performed in winter and the grafts tied in bundles of fifty and stored in moist sand or sawdust in a cool cellar until planting time.

Cleft-grafting.—This is one of the simplest methods of grafting. It is almost always used in top-grafting

trees; it is also used in crown-grafting where the stock exceeds one inch in diameter.

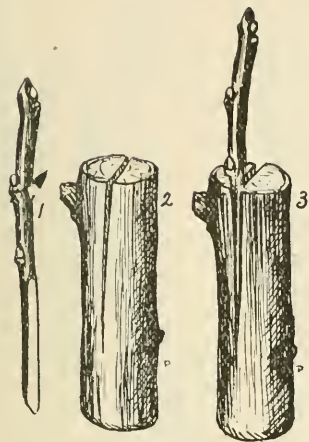


FIG. 20.—CLEFT GRAFTING.

1. Scion Properly Cut.
2. Stock Cleft.
3. Scion in Place Ready for Wrapping.

The scion should be at least four inches long. Its lower end should be cut wedge-shape and slightly thicker on one side than on the other (Fig. 20 [1]). The stock is cut off squarely with a fine-toothed saw. With a grafting iron it is split (Fig. 20 [2]), and with the point of the grafting iron the cleft is held open until the scion is inserted. When large stocks are used it is best to insert two scions—one on each side of the stock. In inserting the scion the cambium layer on

the thicker side of the wedge should be in contact with the cambium layer of the stock (Fig. 20 [3]).

When the point of the grafting iron is removed the cleft closes up and holds the scion in place. It is then firmly wrapped with grafting cord or cloth; the entire union is then covered with grafting wax. It is not necessary to wrap the union if the pressure of the stock is sufficient to hold the scion in place.

Saddle-grafting.—Saddle-grafting is practiced with a few plants. It consists in cutting the upper end of the stock wedge-shape (Fig. 21 [1]). The lower end of the scion is cut off squarely and a cleft made into this lower end (Fig. 21 [2]). The scion is then pushed onto the stock so that the wedge of the stock fits into the cleft of the scion (Fig. 21 [3]). The cambium layers should be in contact. The union is wrapped with grafting cord, and covered with grafting wax.

Side-grafting.—Side-grafting is a very simple method of grafting. It is sometimes used with the plum and a few other

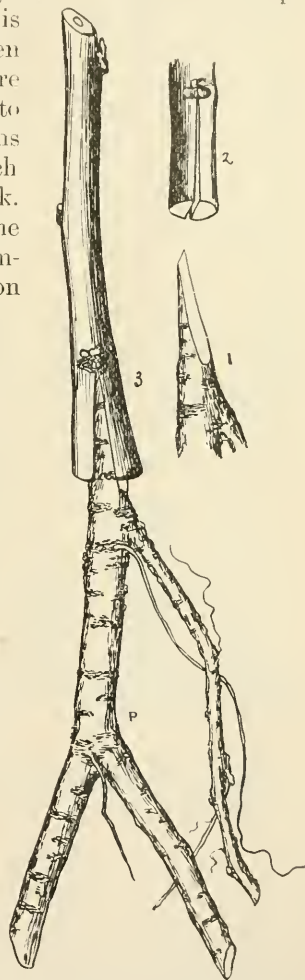


FIG. 21.—SADDLE GRAFTING OF MULBERRY.

1. Stock Trimmed to Wedge.
2. Scion Cleft.
3. Scion Placed on Stock Ready for Tying.

plants. It can be employed in grafting on the stem or root.

A deep oblique incision is made into the root of stem (Fig. 22 [2]). The scion should be about four inches long with the lower end cut wedge-shaped (Fig. 22 [1]). It is then pushed into the incision (Fig. 22 [3]). The union is wrapped with grafting cord. It is also well to cover it with grafting wax if the union is above the ground.

Bridge-grafting.—This method of grafting is employed in bridging over or closing up wounds on the trunks of trees. The bark is trimmed off smoothly into the healthy tissue, on each end and side of the wound (Fig. 23 [1]). With a chisel an oblique cut is made into the bark at each end of the wound; if the wound is large, of course a number of incisions must be made. Cut the scions two inches longer than the length of the wound; sharpen each end wedge-shape and insert each end into the incision at the ends of the wound (Fig. 23 [2]). Sometimes the ends of each scion are simply pushed un-



FIG. 22.—SIDE GRAFTING OF PLUM.

1. Scion Prepared.
2. Stock Showing Wide Cut.
3. Scion and Stock in Place Ready for Tying.

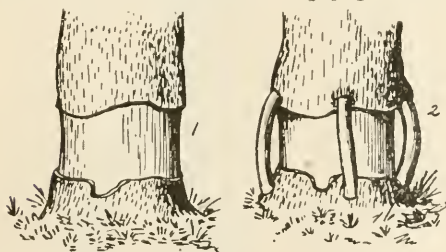


FIG. 23.—BRIDGE GRAFTING. (After Thomas).

1. Wound with Bark Trimmed.
2. Wound Bridged Over with the Scions Ready for Wrapping.

der the bark; scions from one-quarter to one-half an inch in diameter are best. The ends of the wound should then be firmly wrapped with grafting cloth to hold the scions in place. Instead of grafting cloth any strong cloth may be used, but grafting wax should be poured over the bandage. The scions will soon unite with the edges of the wound and with each other, closing up the entire wound.

THE NURSERY.

Soil.—The soil best adapted to the growing of young trees is one in which there is a considerable amount of clay. Heavy soils are preferable to light sandy ones, though a comparatively light soil with a clay subsoil within ten to twelve inches of the surface gives fair

results. The land should preferably be level, if not it should be terraced, but in any case the drainage should be good.

Before setting out the trees or other plants, the land should be well prepared. Plow deeply and cultivate thoroughly to give a soil in which the roots will develop and grow well. In hard, compact soils the root system will be deficient. The best preparation for clay lands for at least two seasons before setting out the trees is to plant it in cowpeas, or some other legume. If the whole crop can be turned under after it is dead and dry, so much the better, but good results will follow the growing of the crop for hay and turning the stubble. The cowpea crop should receive some potash and phosphoric acid fertilizer to insure a heavier growth. Cowpeas will collect nitrogen from the soil, store it up in their roots, stems and leaves and return it to the soil when these parts are plowed into the land. But just as important, and from one standpoint more important, is the amount of humus which they put into the land. This helps to put the land into the best mechanical condition possible. The whole idea along this line may be summed up by saying, "Make the soil as nearly like virgin forest soil as possible."

Heavy dressings of stable manure are excellent for nearly all nursery trees or plants. Fifteen to twenty tons of manure may be used per acre. If a sufficient quantity cannot be secured the manure may be composted with an equal quantity of woods mold to advantage. The manure should preferably be broadcasted over the surface of the ground and then harrowed in with a disc or cutaway harrow. Well-rotted manure should be given the preference.

Planting.—The seedlings intended for grafting or budding in the nursery row, cuttings or whip-grafts may be set either in spring or fall. Generally speaking spring should be given the preference. This is particularly true in western North Carolina. In the eastern part of the State plantings may be made during the winter months.

Planting may be done with a dibber (a good one can be made from an old spade handle) or a furrow may be run, the plants set in position and a second furrow thrown against them. The ground should then be packed firm and compact about them.

The rows should be from three to four feet apart to permit of horse cultivation, the trees or plants being from twelve to eighteen inches apart in the rows.

Fertilizers.—Fertilizers must be used on many soils and there are few which are not benefited by it. They should not be used in the nursery to excess, else the trees will grow too rapidly, resulting in a sappy, succulent and undesirable growth. The growth should be firm, hard and well matured, not unduly forced. The fertilizers used in the nursery should be comparatively rich in nitrogen or ammonia. Large amounts of this plant food are necessary in the mak-

ing of leaves and woody growth. Many North Carolina clays contain considerable amounts of potash and this may not need to be applied in large quantities. But much will depend upon the previous treatment and preparation of the soil. The phosphoric acid content of these same soils is usually low. A fertilizer analyzing 6 per cent phosphoric acid, 4 per cent potash and 4 per cent nitrogen will be found about right for most soils. The amounts which can be economically and profitably used will depend upon the character of the soil, and its previous treatment. It is a good rule to use the fertilizer at such times and in such quantities as the needs of the tree may indicate. If the trees are growing rapidly, with weak, sappy growth, the indication is that they are receiving enough or too much nitrogen. If on the other hand, they are not thrifty, making an unsatisfactory growth, they would likely be benefited by more nitrogen.

Cultivation.—From the time growth begins in spring until autumn, the ground should be kept clean. Frequently shallow cultivations should be given to preserve a dust blanket to prevent the loss of moisture from the soil and to destroy weeds and grass. Every ten days, or about that often, the ground should be gone over with the cultivator. As soon as possible after each rain cultivation should be given to break up the crust which naturally forms after each rainfall. This will preserve the soil moisture and go a long way in helping the trees to make a satisfactory growth.

Rotation.—The cultivation which must necessarily be given nursery trees is very hard on the land. Its store of vegetable matter is rapidly lost and the soil becomes hard and compact. Besides, the trees are dug and the ground is worked over in wet weather. This, too, increases the evil, and a soil in very bad mechanical condition is the result. In many cases a block of trees occupies the ground anywhere from three to five years. Then the trees themselves do not take very much from the soil, but the treatment which the land receives in cultivation and digging is anything but ideal. After one block of trees is removed another may be set in the same ground. Such cases are exceptions, however, and in general this should not be done. It is better to put the land in other crops for some years and allow it to recuperate. Nothing is better than to use it for the growing of cowpea hay, or leguminous crops of some kind, red clover, crimson clover or hairy vetch.

STOCKS, METHODS AND GENERAL NOTES.

APPLE: *Stocks.*—Seedling apples.

Methods.—Whip-grafting at the crown, and on piece roots.

Shield-budding.

Cleft-graft for top-working.

Most of the apple stocks used by nurserymen are either imported from France or grown in Kansas, Nebraska, Iowa, or Missouri. If so desired seeds may be taken from the pomace from cider mills and seeds removed from it by washing in a box in running water. Seeds may be sown either in spring or fall. The seed rows should be made three feet or more apart and during the growing season should be cultivated often. Do not sow too thickly or the seedlings will have to be thinned out. By autumn the tops will be twelve inches or so in length with an equal amount or so of root. The young trees are dug up and the whole root either used for a single tree or cut into several pieces, and whip-grafted on several scions. If so desired the seedlings may be shield-budded in the nursery row when they are one year old. Seedling or otherwise undesirable trees, if vigorous and healthy, may be top-worked in spring by top-grafting.

APRICOT: *Stocks.*—Seedling plum, peach and apricot.

Method.—Shield-budding.

The plum, peach or apricot stocks are grown as already directed. (See Seeds for Stocks). These are to be shield-budded when one or two years old.

For light soils the peach should be given preference. On clay lands the plum is best, while the apricot may be used as a stock on rich, well-drained land.

BLACKBERRY: Propagated by root-cuttings and suckers.

The suckers which come from the old plants may be taken away and planted. Propagation by root-cuttings is usually preferable. Select roots from one-quarter to one-half inch in diameter, cut them into pieces of two inches or so in length, store them in moist sand during the winter and plant them out in spring. These should be planted an inch or two deep in rich soil.

CHERRY: *Stocks.*—Cherry (Mahaleb and Mazzard).

Methods.—Shield-budding.

Whip-grafting.

The cherry-seed must be sown very shortly after being taken from the fruit or else stratified until spring. The young trees are treated as already directed for apples, and either grafted during the winter or budded in the nursery row in spring. They may also be propagated by root-cuttings.

CHESTNUT: *Stock*.—American chestnut.

Method.—Whip-grafting above ground.

The best stock for the chestnut whether Japanese, Spanish or native is the American chestnut. The seed should be stratified as soon as gathered and planted out in spring. The stock should be cultivated during the first season and in the second, if they have attained sufficient size, they may be whip-grafted.

CURRENT: Propagated from cuttings and sometimes by tip-layers.

The cuttings should be removed from the plants in fall and stored under suitable conditions until spring, when they are planted out. The following autumn they may be ready for transplanting or they may have to remain for two years in the nursery.

DEWBERRY: Propagated by root-cuttings, tip-layers and layers of whole canes.

The dewberry may be propagated from root-cuttings like the blackberry. The canes may be placed with their tips on the ground to form tip-layers; or the canes may be laid on the ground and covered over at the nodes or joints, at which joints roots will form.

FIG: Propagated by hard wood cuttings and single eye cuttings.

The fig may be propagated from cuttings as directed for the currant. If the variety is particularly desirable single-bud or eye-cuttings may be made. These should be planted in pots or a very well prepared seed-bed.

GOOSEBERRY: Propagated from cuttings of matured, tip-layers, wood and by mound-layering about June.

May be propagated as directed for the currant. Mound layers may be made about the month of June. It is usually best to remove the layers from the plants and cultivate them one year before setting them out in permanent plantings.

GRAPE: Cuttings, serpentine layers.

Cleft-grafting of old stocks.

The favorite methods of propagating the grape is by cuttings. These may be taken directly from the vine sometime before the sap starts to move, and planted.

GRAPE, MUSCADINE: Cuttings and layers.

With the Muscadine type the favorite method is by means of layers.

HAZEL NUT: Propagated by suckers, layers and cuttings.

While the hazel nut may be propagated from suckers and cuttings the best method is by means of layers. These should be bent out from the parent plant, pegged down with a crotched stick and covered with three or four inches of dirt. If put down in spring before growth starts they will be ready to transplant the following autumn.

MULBERRY: *Stocks*.—White and Russian mulberry.

Methods.—Propagated by cuttings and by saddle or cleft-grafting.

Roots readily from cuttings; these should be taken from the trees in autumn, stored until spring and then set out. Sometimes the mulberries are grown by grafting on white or Russian mulberry stocks. Good results can be secured by saddle-grafting on pieces of white mulberry root. This work should be done in winter and the young plants stored until spring and then planted.

PEACH: *Stock*.—Peach.

Method.—Shield-budding.

The seeds should be sown in autumn, shallow enough to be exposed to frost, which helps materially in cracking them. For more uniform results the pits may sometimes be cracked by hand and sowed in spring. The seeds should not be allowed to dry out. This can be prevented by stratifying them. If planted in good ground the stocks will be ready to bud early in the same summer. The peach is commonly propagated by shield-budding in the nursery row. Very easily propagated.

PEAR: *Stocks*.—Pear; Dwarf pears on Anger's quince.

Chinese (Keiffer, Smith, Le Conte, Garber) pears from cuttings.

Methods.—Shield-budding.

Whip-grafting with long scions.

Stocks are grown as in the case of the apple, and the seedlings are transplanted to nursery row and budded when one year old. The Chinese pears grow nicely from cuttings made in winter and planted out in spring.

PECAN: *Stock*.—Pecan.

Methods.—Annular and patch-budding.

Whip-grafting.

Cleft-graft is used to some extent in top-work-
ing.

The nuts should be sowed as soon as ripe, or else stratified until spring, when they are planted out in nursery rows. If planted in very rich soil and well cultivated and fertilized during the first season some of them may be large enough to graft or bud when one year old. Generally, however, they do not attain sufficient size until they are two years old. They may be whip-grafted in the nursery row in spring with scions taken off in winter. They may be propagated by annular or patch-budding during the months of June, July and August.

PERSIMMON, JAPAN: *Stock*.—American persimmon.

Method.—Whip-grafting at the crown.

Native persimmon seeds should be sown in nursery rows in autumn and the plants well cultivated during the following summer. The following spring they may be grafted in the nursery row. Whip-grafting is the favorite method.

PLUM: *Stocks*.—Plum, native and Myrobolan.

Methods.—Shield-budding.

Side-grafting.

Whip-grafting.

Sometimes grown from cuttings and suckers.

Plum pits intended for stocks are treated much as peach pits, though they are seldom cracked by hand. When one year old they are usually worked by shield-budding. Side and whip-grafting are also used to some extent. Plums may also be grown from cuttings and suckers. The wild goose plum grows well from cuttings.

POMEGRANATE: Grown from seeds, cuttings and suckers.

Treat the cuttings and suckers as already described.

QUINCE: *Stock*.—Anger's quince.

Method.—Whip-grafting.

Also grown from cuttings and mound layers.

The favorite method of propagating the quince is by means of cuttings or by mound layers. Heel cuttings about one foot long should be taken from the plants in autumn, stored in damp sand until spring and set out in autumn. Most of the quince stock used for propagating is imported.

RASPBERRY, RED: Propagated by root cuttings and suckers.

The favorite methods of propagating the red raspberry are by means of suckers and root-cuttings. These methods have already been described.

RASPBERRY, BLACKCAP: Root-cuttings and tip-layers.

The favorite method of propagating the blackcap is by means of tip-layers. These frequently bend over, and reaching the ground strike root. In some cases it may be necessary to hold them down with a little earth thrown over them. If propagated by means of root-cuttings they should preferably be planted early in spring in cold frames.

STRAWBERRY: Propagated from plantlets developed upon the runners sent out from the parent plants.

THE BULLETIN

OF THE

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DEPARTMENT OF AGRICULTURE

- I. VARIETY AND DISTANCE TESTS OF CORN.
- II. VARIETY AND DISTANCE TESTS OF COTTON.
- III. FERTILIZATION AND CULTIVATION OF CORN AND COTTON.
- IV. COMPOST AND COMPOSTING.
- V. FERTILIZERS FOR TOBACCO.



CORN AND COTTON PLATS—EDGEcombe TEST FARM.

FEBRUARY, 1906

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION

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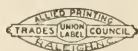
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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 2.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, FEBRUARY, 1906.

SIXTH (PARTIAL*) REPORT OF THE WORK ON THE DEPARTMENT TEST FARMS FOR SEASON 1905, INCLUDING VARIETY AND DISTANCE TESTS OF CORN AND COTTON.

BY

B. W. KILGORE, STATE CHEMIST,

C. B. WILLIAMS, ASSISTANT CHEMIST.

AND

G. T. BULLOCK, SUPERINTENDENT EDGECOMBE TEST FARM,

F. T. MEACHAM, SUPERINTENDENT IREDELL TEST FARM.

On the following pages are recorded the results of this year's work with the variety and distance tests of corn and cotton on the Department's Test Farms. The testing of these two factors in the production of cotton and corn is of the most fundamental importance, as is evidenced by the difference in yield of different varieties and of different distancing when grown side by side in the same field, on the same type of soil, with identical cultivation and fertilization. Its importance is further emphasized when it is considered that 64.7 per cent (17.5 per cent to cotton and 47.2 per cent to corn) of the cultivated lands of North Carolina are devoted to these two crops with the small average annual yields of 215 pounds of lint cotton and 12.8 bushels shelled corn per acre. If by carefully conducted experiments through a number of years the most advantageous distancing and most prolific varieties of corn and cotton on the different types of soil for an average season can be ascertained, and farmers generally be induced to use the best varieties and distances in growing these crops, material assistance will have been rendered in increasing the total amounts per acre of these crops grown in the State. Increasing the average yield of corn one bushel and seed cotton fifty pounds per acre will, according to the census of 1900, increase the

*The main portion of the work for 1902, 1903, 1904 and 1905 is reserved for publication later, when the results of our tests, which have now been running some five or six years, will be brought together, with the view of drawing such conclusions as may be warranted on the subjects covered by the experiments.

annual profits of the farmers of North Carolina by about \$3,400,000, allowing sixty cents per bushel for shelled corn and three and one-half cents per pound for seed cotton. This does not appear, with the hearty co-operation of farmers, such a far-distant possibility, in the light of results obtained during the past six years in our testing of varieties of corn and cotton. Take, for example, the results of our variety tests at the Edgecombe farm* during this time. In comparative variety tests of corn, with the number of varieties in the different tests varying from eight to twenty-nine, we have found the difference between the one yielding the highest and the one the lowest amount of shelled corn per acre in the individual tests to range from 6.2 to 15.2 bushels. With cotton the range of difference in the different tests has been all the way from 530 to 790 pounds of seed cotton per acre, when from seven to twenty-three varieties were used in the different tests. It must not be forgotten that the best distancing of any crop is principally dependent upon soil fertility, while yield of a variety is governed largely by soil fertility and adaptability and by the rigidity with which selection of seed of desirable characteristics has been made.

LOCATION AND CHARACTER OF SOILS OF TEST FARMS.

Edgecombe Farm.—This farm is located in Edgecombe County, about midway between the towns of Tarboro and Rocky Mount, and about two miles from Kingsboro, a station on the Atlantic Coast Line Railway.

The soil of this farm consists, principally, of sandy loam, with moderately fine sand, underlaid by a rather tenacious sandy clay subsoil at a depth, generally, of from 8 to 12 inches. The subsoil is a moderately good sandy clay, such as is found under the larger portion of the lands of the eastern part of the State. This type of soil responds very readily in remunerative crops to proper fertilization and cultivation, and represents a large and important part of the coastal plain formation, which comprises something like forty per cent of the total area of the State. It is the type of soil designated by the National Bureau of Soils as Norfolk fine sandy loam.

Red Springs Farm.—This farm is situated in the coastal plain region, about one mile east of the corporate limits of the town of Red Springs in Robeson County, on a coarse, sandy soil that has a sandy clay subsoil from 12 to 15 inches below the surface. This type of soil is found in considerable areas in the eastern and southeastern portions of the State, and being of a dry nature and warming up early in the spring, it is especially adapted to the growth of truck and other crops where early maturity is an important consideration. Although this type of soil is not as strong as that found on the Edgecombe farm it will produce fairly good yields under liberal fertilization and proper cultivation and rotation of crops.

*The results at the Edgecombe farm are taken for these comparisons because, it being the oldest farm, we have data for a greater number of years.

Iredell Farm.—This farm, located in the Piedmont section of the State, lies about one and one-half miles northwest of the corporate limits of Statesville, and is bisected by the Statesville and Western Division of the Southern Railway.

The soil consists of a deep red tenacious clay soil and subsoil, which is a type covering a large area of the Piedmont Plateau of this and other South Atlantic States. Generally the only difference between the surface and subsoil in this type of soil is that the former, having been broken up by cultivation and weathering, has more or less vegetable matter worked into it.

This soil is naturally strong, and is susceptible of high productivity under judicious fertilization and proper cultural management. It is especially adapted to the growth of grains, grasses and clover.

I. VARIETY, VARIETY-DISTANCE AND DISTANCE TESTS OF CORN.

Preparation and Cultivation.—The plats were all broke alike with a two-horse turning plow 8 to 10 inches deep and harrowed. Soon after the rows were run 4 to 5 inches deep and 4 feet apart in variety tests and the several distances in the distance tests.

The fertilizer materials were applied uniformly in these drills and covered, the application being at the following rate per acre in all tests:

Three hundred pounds of a mixture of acid phosphate, dried blood and manure salt,* which contained 7 per cent available phosphoric acid, $1\frac{1}{2}$ per cent potash and 3 per cent nitrogen (equal to 3.64 per cent ammonia), costing \$3.24, were used.

The slight ridges formed in covering the fertilizer were opened and the corn planted a little below the level, all tests of the same kind at the same farm being given the same treatment as to time of planting and otherwise. All cultivations were as nearly level as possible and rather deep early in the season, with the small hoes of the Planet Jr. Cultivator, but became shallower, using the large hoes as the season advanced and the roots extended towards the middle of the rows and nearer the surface. This system of cultivation afforded pretty thorough breaking of the land early in the season and prevented the disturbance of the root systems of the plants later. An effort was made to cultivate every ten or twelve days, as far as the weather would permit, and especially immediately after rains, in order to produce a fine dust mulch with the shallow-running plows, to retard the evaporation of the recently-added moisture.

This corn was harvested and shocked on September 6 at the Edgecombe farm, and August 31 to September 11 at the Iredell farm, as each variety matured, but was not husked until November 27 and 28 at the former and November 13 and 14 at the latter.

RESULTS OF VARIETY TESTS OF CORN.

The results of this test are contained in the following tables:

*Manure salt is a potash compound, containing about 20 per cent of potash, principally in the form of muriate.

TABLE I—RESULTS OF VA

EDGEcombe

Rank in Productivity.		Varieties Tested.	Number Stalks per Plat.		Date of Silking.	Average Height in Inches at Maturity.		Number Ears per Plat.	Average Number of Ears per Stalk.	Yield per Plat.	
Shelled Corn.	Stover.		For Perfect Stand.	By Actual Count.		Stalks.	Ears.			Large Ears—Pounds.	Nubbins—Pounds.
1	14	Cocke's Prolific -----	218	203	-----	127.0	58.5	-----	-----	112.00	14.50
2	16	Weekley's Improved -----	218	213	-----	126.6	60.3	-----	-----	103.00	17.00
3	9	Thomas' Improved -----	218	208	-----	114.9	52.7	-----	-----	104.50	6.00
4	11	Sanders' Improved -----	218	210	-----	116.4	56.2	-----	-----	95.00	9.50
5	13	Pool's -----	218	193	-----	116.6	46.0	-----	-----	90.00	13.50
6	10	Hickory King -----	218	210	-----	127.4	52.5	-----	-----	90.00	10.00
7	3	Holt's Strawberry -----	218	202	-----	124.5	63.0	-----	-----	104.50	6.00
8	21	Selection 77 -----	218	198	-----	122.2	63.0	-----	-----	94.50	5.00
9	15	Boone County White -----	218	197	-----	121.7	53.9	-----	-----	92.00	7.50
10	19	Hickory King -----	218	200	-----	121.6	56.0	-----	-----	81.50	8.00
11	17	Marlboro Prolific -----	218	201	-----	120.3	59.3	-----	-----	88.50	9.75
12	8	Eureka -----	218	207	-----	123.0	62.0	-----	-----	83.50	14.00
13	5	Brake's -----	218	205	-----	129.4	58.4	-----	-----	80.50	11.50
14	12	Cocke's Prolific -----	218	198	-----	129.0	60.4	-----	-----	78.00	14.00
15	6	McMackin's Gourd Seed -----	218	206	-----	126.5	65.2	-----	-----	79.00	8.75
16	21	Boone County Special -----	218	193	-----	119.9	50.3	-----	-----	78.00	6.50
17	7	Square Deal -----	218	203	-----	133.4	72.8	-----	-----	77.00	9.00
18	27	Riley's Favorite -----	218	194	-----	105.7	46.0	-----	-----	71.50	9.50
18	1	Peele's Prolific -----	218	208	-----	116.3	54.7	-----	-----	76.00	10.00
19	23	Shellem's Prolific -----	218	208	-----	116.3	49.6	-----	-----	74.00	7.00
20	18	Native -----	218	212	-----	111.3	52.5	-----	-----	70.50	8.00
21	4	Williams' -----	218	212	-----	119.6	53.4	-----	-----	79.50	10.50
21	26	Leaming Yellow -----	218	197	-----	108.7	43.0	-----	-----	74.00	8.00
21	22	Craig's Prolific—White -----	218	202	-----	119.0	53.0	-----	-----	67.50	9.50
22	2	Mosby's Prolific -----	218	211	-----	125.0	66.2	-----	-----	63.50	16.00
23	28	Reid's Yellow Dent -----	218	191	-----	106.4	42.2	-----	-----	65.50	11.50
23	25	Boone County White -----	218	156	-----	121.8	50.0	-----	-----	74.50	5.00
23	20	Currituck -----	218	205	-----	115.3	54.0	-----	-----	67.50	10.00
24	24	Iowa Silver Mine -----	218	186	-----	108.7	41.4	-----	-----	64.00	10.25

RIETY TEST OF CORN.

FARM.

Ears—Pounds.	Yield per Acre.		Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
	Shelled Corn—Bushels.				Average Length—Inches.	Average Circumference—Inches.	Grain—per cent.	Cob—per cent.	Ears—per cent.	Stover—per cent.			
2530.00	35.9	146.2	70.4	-----	79.5	20.5	49.6	50.4	2570	-----	Edgecombe Test F ^r m.		
2400.00	35.5	162.1	67.6	-----	82.8	17.2	49.0	51.0	2500	-----	Iredell Test Farm.		
2210.00	32.4	115.4	68.3	-----	82.0	18.0	43.3	56.7	2890	-----	North Carolina.		
2090.00	31.8	140.2	65.7	-----	85.2	14.8	43.5	56.5	2710	-----	Georgia.		
2070.00	31.5	132.2	65.7	-----	85.2	14.8	45.0	55.0	2530	-----	North Carolina.		
2000.00	31.2	145.7	64.2	-----	87.2	12.8	41.7	58.3	2800	-----	Tennessee.		
2210.00	30.6	96.3	72.3	-----	77.5	22.5	38.1	61.9	3590	-----	Virginia.		
1990.00	29.5	113.9	67.4	-----	83.1	16.9	49.8	50.2	2010	-----	Ohio.		
1990.00	28.9	103.4	68.8	-----	81.4	18.6	44.2	55.8	2510	-----	Tennessee.		
1790.00	28.1	133.7	63.6	-----	88.0	12.0	45.9	54.1	2110	-----	Virginia.		
1965.00	27.9	166.3	70.5	-----	79.4	20.6	46.8	53.2	2235	-----	South Carolina.		
1950.00	27.7	144.1	70.5	-----	79.4	20.6	39.8	60.2	2950	-----	Virginia.		
1840.00	26.9	99.5	68.4	-----	81.8	18.2	36.8	63.2	3160	-----	North Carolina.		
1840.00	26.8	147.5	68.7	-----	81.5	18.5	40.9	59.1	2660	-----	Tennessee.		
1755.00	25.9	101.8	67.7	-----	82.7	17.3	35.8	64.2	3145	-----	Tennessee.		
1690.00	25.2	110.0	67.0	-----	83.6	16.4	46.9	53.1	1910	-----	Illinois.		
1720.00	25.0	102.9	68.9	-----	81.3	18.7	36.6	63.4	2980	-----	North Carolina.		
1620.00	24.6	125.3	65.9	-----	84.9	15.1	54.0	46.0	1380	-----	Indiana.		
1720.00	24.6	99.1	69.9	-----	80.1	19.9	31.3	68.7	3780	-----	North Carolina.		
1620.00	24.5	190.7	66.0	-----	84.8	15.2	47.7	52.3	1780	-----	North Carolina.		
1570.00	24.2	128.8	65.0	-----	86.2	13.8	42.4	57.6	2130	-----	North Carolina.		
1800.00	24.1	113.9	74.8	-----	74.9	25.1	36.0	64.0	3200	-----	North Carolina.		
1640.00	24.1	132.5	68.0	-----	82.3	17.7	52.9	47.1	1460	-----	Ohio.		
1540.00	24.1	128.9	63.8	-----	87.8	12.2	45.3	54.7	1860	-----	North Carolina.		
1590.00	23.9	134.8	66.4	-----	84.3	15.7	30.0	70.0	3710	-----	Mississippi.		
1540.00	23.3	131.0	66.2	-----	84.6	15.4	55.0	45.0	1260	-----	Illinois.		
1590.00	23.3	94.3	68.3	-----	82.0	18.0	49.7	50.3	1610	-----	Indiana.		
1550.00	23.3	106.3	66.4	-----	84.3	15.7	43.1	56.9	2050	-----	North Carolina.		
1485.00	22.3	124.0	66.7	-----	83.9	16.1	46.4	53.6	1715	-----	Illinois.		

TABLE I—RESULTS OF VARIETY

IREDELL

Rank in Productivity.		Varieties Tested.	Number Stalks per Plat.		Date of Silking.	Average Height in Inches at Maturity.		Number Ears per Plat.	Average Number of Ears per Stalk.	Yield per Plat.	
Shelled Corn.	Stover.		For Perfect Stand.	By Actual Count.		Stalks.	Ears.			Large Ears—Pounds.	Nubbins—Pounds.
1	11	Cocke's Prolific -----	218	200	July 16	120.0	50.4	335	1.68	128.00	7.00
2	2	Weekley's Improved -----	218	220	" 20	132.0	72.0	520	2.36	118.00	11.00
3	17	American Queen -----	218	220	" 16	120.0	48.0	410	1.86	111.50	14.00
4	2	Thomas' Improved -----	218	217	" 17	120.0	42.0	271	1.25	124.00	2.00
5	4	Williams' -----	218	205	" 19	122.4	54.0	246	1.20	117.50	5.00
6	8	Hickory King -----	218	230	" 14	126.0	66.0	260	1.13	107.00	9.00
7	18	Brake's -----	218	205	" 17	126.0	66.0	240	1.17	122.00	5.00
8	9	Pool's -----	218	220	" 12	120.0	54.0	350	1.59	112.50	4.00
9	20	Cocke's Prolific -----	218	215	" 16	132.0	60.0	375	1.74	111.50	8.00
10	11	Shellem's Prolific -----	218	210	" 11	120.0	57.6	420	2.00	102.00	8.00
11	25	Hickory King -----	218	225	" 13	120.0	60.0	340	1.51	103.00	5.00
12	5	Marlboro Prolific -----	218	211	" 15	114.0	48.0	350	1.66	106.00	5.00
13	7	Sanders' Improved -----	218	211	" 20	114.0	54.0	340	1.61	103.00	4.00
14	23	Boone County White -----	218	225	" 14	120.0	48.0	214	.95	99.50	4.00
15	13	Boone County Special -----	218	225	" 10	120.0	48.0	235	1.04	98.00	3.00
16	6	Goodman's Prolific -----	218	224	" 20	126.0	60.0	253	1.14	93.00	6.00
17	15	Peele's Prolific -----	218	209	" 19	122.4	60.0	243	1.16	99.25	3.00
18	1	Craig's Prolific—White -----	218	205	" 17	120.0	48.0	215	1.05	95.00	6.00
19	3	Holt's Strawberry -----	218	230	" 17	122.4	72.0	220	.96	101.00	4.00
20	21	Reid's Yellow Dent -----	218	215	" 8	108.0	42.0	260	1.21	94.00	6.00
21	14	Leaming Yellow -----	218	205	" 8	114.0	42.0	250	1.22	98.50	3.00
22	10	Currituck -----	218	221	" 17	123.6	54.0	252	1.14	94.00	5.00
23	22	Square Deal -----	218	195	" 20	132.0	60.0	220	1.13	90.00	8.00
24	24	Iowa Silver Mine -----	218	205	" 4	114.0	48.0	250	1.22	94.50	3.00
25	26	Selection 77 -----	218	205	" 14	120.0	48.0	255	1.24	97.25	2.00
26	16	Eureka -----	218	205	" 16	123.6	48.0	320	1.56	92.00	8.00
27	27	Riley's Favorite -----	218	225	" 8	114.0	48.0	260	1.16	90.00	6.00
28	10	McMackin's Gourd Seed -----	218	231	" 20	132.0	60.0	242	1.05	90.00	4.00
29	19	Native -----	218	200	" 20	123.6	54.0	200	1.00	77.00	10.00
30	22	Boone County White -----	218	215	" 15	122.4	48.0	245	1.14	88.00	5.00
31	12	Mosby's Prolific -----	218	220	" 20	120.0	60.0	335	1.52	83.50	7.00

TEST OF CORN—CONTINUED.

FARM.

Yield per Acre.		Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
Ears—Pounds.	Shelled Corn—Bushels.			Average Length—Inches.	Average Circumference—Inches.	Grain—per cent.	Cob—per cent.	Ears—per cent.	Stover—per cent.			
2700.0	41.0	156.5	65.9	9.00	6.50	85.0	15.0	54.0	46.0	2300	57.5	Edgecombe Farm.
2580.0	40.3	184.0	64.0	9.00	8.50	87.5	12.5	44.5	55.5	3220	57.5	Iredell Farm.
2510.0	39.2	163.2	64.0	8.00	6.00	87.5	12.5	53.4	46.6	2190	56.0	Virginia.
2520.0	38.8	118.5	65.4	9.25	7.25	86.3	13.7	43.9	56.1	3220	57.0	North Carolina.
2440.0	38.7	110.4	63.1	9.50	6.50	88.8	11.2	47.9	52.1	2650	56.5	North Carolina.
2320.0	38.1	143.2	61.0	8.50	5.50	91.9	8.1	49.4	50.6	2380	56.0	Tennessee.
2540.0	37.4	100.1	67.9	8.00	8.00	82.5	17.5	56.4	43.6	1960	56.0	North Carolina.
2330.0	35.4	148.2	65.9	9.00	6.50	85.0	15.0	49.7	50.3	2360	58.0	North Carolina.
2390.0	35.2	159.5	67.9	8.50	6.50	82.5	17.5	56.9	43.1	1810	57.5	Tennessee.
2200.0	33.9	194.8	64.9	8.50	4.50	86.3	13.7	48.9	51.1	2300	56.0	North Carolina.
2160.0	33.8	152.0	64.0	8.50	6.00	87.5	12.5	61.7	38.3	1340	58.0	Virginia.
2220.0	33.5	162.6	66.4	8.25	6.00	84.4	15.6	45.7	54.3	2640	58.0	South Carolina.
2140.0	33.4	147.2	64.0	7.50	6.25	87.5	12.5	45.5	54.5	2560	56.5	Georgia.
2070.0	32.8	110.4	63.1	9.50	7.50	88.8	11.2	55.1	44.9	1690	56.0	Indiana.
2020.0	32.5	115.1	62.2	11.00	6.50	90.0	10.0	47.0	53.0	2280	56.0	Illinois.
1980.0	32.3	135.0	61.4	9.00	7.75	91.3	8.7	43.0	57.0	2620	56.0	North Carolina.
2045.0	32.0	118.4	64.0	7.25	6.75	87.5	12.5	47.6	52.4	2255	58.0	North Carolina.
2020.0	31.8	117.6	63.5	7.25	7.00	88.1	11.9	36.7	63.3	3480	55.0	North Carolina.
2100.0	31.7	107.9	66.4	9.50	7.50	84.4	15.6	41.2	58.8	3000	54.0	Virginia.
2000.0	31.3	126.4	64.0	9.50	7.25	87.5	12.5	52.6	47.4	1800	59.0	Illinois.
2030.0	31.0	126.8	65.4	8.50	6.50	85.6	14.4	47.2	52.8	2270	58.5	Ohio.
1980.0	30.9	115.2	64.0	9.50	7.75	87.5	12.5	46.0	54.0	2320	56.0	North Carolina.
1960.0	30.6	112.0	64.0	8.00	7.00	87.5	12.5	53.0	47.0	1740	56.0	North Carolina.
1950.0	30.5	126.4	64.0	8.50	6.50	87.5	12.5	57.4	42.6	1450	54.0	Illinois.
1985.0	29.7	132.1	66.9	9.00	6.00	83.8	16.2	62.0	38.0	1215	55.0	Ohio.
2000.0	29.5	152.7	67.9	9.50	6.00	82.5	17.5	47.6	52.4	2200	58.0	Virginia.
1920.0	28.7	130.4	66.9	9.00	5.50	83.8	16.2	68.6	31.4	880	58.0	Indiana.
1880.0	28.5	121.9	65.9	8.00	7.50	85.0	15.0	44.8	55.2	2320	52.0	Tennessee.
1740.0	28.0	208.4	62.2	8.00	7.75	90.0	10.0	48.3	51.7	1860	57.0	North Carolina.
1860.0	27.8	125.4	66.9	10.00	7.00	83.8	16.2	51.7	48.3	1740	55.0	Tennessee.
1810.0	27.5	168.0	65.9	9.00	6.00	85.0	15.0	44.1	55.9	2290	58.0	Mississippi.

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN.

EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		Aver- ages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.		
Cocke's Prolific (Edgecombe) -----	20.0	2	28.1	2	35.2	1	24.4	1	30.3	5	35.9	1	29.0	1
Cocke's Prolific (Tenn.) -----							19.9	7	26.4	12	26.8	14		
Weekley's Improved -----	19.4	3	29.5	1	33.5	2	19.5	10	25.5	13	35.5	2	27.1	2
Pool's -----					26.1	5	19.7	8			31.5	5		
Craig's Prolific-Strawberry -----					29.1	3	16.1	16	27.8	8				
Sanders' Improved -----	17.8	4	27.0	3	27.1	4	15.3	17	31.0	3	31.8	4	25.0	3
Holt's Strawberry -----	22.4	1	25.7	6	24.9	6	16.2	15	18.6	25	30.6	7	23.1	4
Craig's Prolific-White -----					24.6	7	14.9	18	27.1	10	24.1	21		
Champion White Pearl -----					21.6	8								
Cooley's Red Cob -----	17.2	6			20.6	10								
Improved Golden Dent -----			22.5	7										
Champion Dent -----			22.2	8										
Hickory King (Tenn.) -----			21.4	9			20.1	6			31.2	6		
Mosby's Prolific -----	17.4	5							23.4	18	23.9	22		
Tatum's Choice -----	17.0	7												
Shaw's Improved -----	16.2	8												
Tennessee Yellow -----			26.6	5										
Killebrew's (Native) -----			26.9	4	21.4	9	22.4	2						
Leaming Yellow -----					20.0	12	21.1	4	24.6	15	24.1	21		
Brake's -----					20.5	11	13.7	19	28.5	7	26.9	13		
Marlboro Prolific -----							17.6	13	32.3	2	27.9	11		
Biggs' Prolific -----							21.4	3	32.4	1				
Iowa Silver Mine -----							17.3	14	25.2	14	22.3	24		
Reid's Yellow Dent -----							17.8	12	23.4	18	23.3	23		
Riley's Favorite -----							19.6	9	22.8	20	24.6	18		
Boone County White (Ind.) -----							19.4	11	26.8	11	23.3	23		
Boone County White (Tenn.) -----							17.6	13	23.9	17	28.9	9		
Number 167 -----							16.2	15						
Selection 77 -----							20.2	5	24.5	16	29.5	8		
Cocke's Prolific (Pou) -----									32.3	2				
Williams' -----									30.5	4	24.1	21		

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CON.

EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		Averages.
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	
Square Deal -----									29.6	6	25.0	17	
Boone County Special -----									27.3	9	25.2	16	
McMackin's Gourd Seed -----									23.3	19	25.9	15	
Horse-tooth -----									22.3	21			
Currituck -----									21.4	22	23.3	23	
Thomas' Improved -----									20.6*	23	32.4	3	
Chester County Mammoth -----									20.3	24			
Hickory King (Va.) -----											28.1	10	
Eureka -----											27.7	12	
Peele's Prolific -----											24.6	18	
Shellem's Prolific -----											24.5	19	
Native -----											24.2	20	

*This variety was planted later than the others and had to be put on poorer land, hence should not be included in the comparisons.

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CON.

RED SPRINGS FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		Averages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.
Native -----	22.4	1	14.1	4						
Coman's Best -----	16.6	2								
Mosby's Prolific -----	15.4	3								
Bradbury's Improved -----	15.0	4								
Cocke's Prolific -----	14.4	5	15.3	3						
Blount's Prolific -----	10.2	6								
Improved Golden Dent -----	10.0	7	14.1	5						
Clarke's Mastodon -----	9.0	8								
Holt's Strawberry -----	8.4	9	17.3	2						
Weekley's Improved -----			19.0	1						
Sanders' Improved -----			14.0	6						
Tennessee Yellow -----			13.5	7						
Hickory King -----			12.4	8						
Champion Dent -----			11.3	9						

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CON.

IREDELL FARM,

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		Aver- ages.
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	
Biggs' Prolific-----							29.7	1	31.8	2			
Craig's Prolific-Strawberry -----							24.7	2	26.0	6			
Marlboro Prolific -----							24.3	3			33.5	12	
Craig's Prolific-White -----							23.9	4	28.8	3	31.8	18	28.2 2
Cocke's Prolific (Tenn.) -----							23.5	5	22.5	14	35.2	9	27.1 3
Weekley's Improved -----							23.3	6	23.4	10	40.3	2	29.0 1
Mosby's Prolific -----							22.6	7	21.9	18	27.5	31	24.0 11
Boone County White (Tenn.) -----							22.6	7	24.6	7	27.8	30	25.0 7
Holt's Strawberry -----							21.9	8	22.3	16	31.7	19	25.3 6
Riley's Favorite -----							21.9	8	20.4	22	28.7	27	23.7 12
Pool's -----							21.8	9			35.4	8	
Sanders' Improved -----							21.7	10	23.5	9	33.4	13	26.2 4
Selection 77 -----							21.2	11	22.9	12	29.7	25	24.6 9
Reid's Yellow Dent -----							20.8	12	21.5	19	31.3	20	24.5 10
Leaming Yellow -----							20.8	12	22.5	14	31.0	21	24.8 8
Hickory King (Tenn.) -----							20.7	13			38.1	6	
Iowa Silver Mine -----							20.6	14	22.5	14	30.5	24	24.5 10
Boone County White (Ind.) -----							19.9	15	24.2	8	32.8	14	25.6 5
Number 167 -----							17.1	16					
Brake's -----									32.4	1	37.4	7	
Cocke's Prolific (Edgecombe) -----									26.3	4	41.0	1	
Horse-tooth -----									26.1	5			
Currituck -----									23.3	11	30.9	22	
Native -----									22.7	13	28.0	29	
Thomas' Improved -----									22.5	14	38.8	4	
Williams' -----									22.4	15	38.7	5	
Boone County Special -----									22.3	16	32.5	15	
Shellem's Prolific -----									22.2	17	33.9	10	
Pride of Burke -----									21.5	19			
McMackin's Gourd Seed -----									21.1	20	28.5	28	
Parks' Large Yellow -----									21.1	20			

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1905.

EDGECOMBE FARM.

Varieties.	Rank According to the Following Characters.												
	Earliness as Shown by Date of Silking.	Yield of Ear Corn in Pounds per Acre.	Yield of Shelled Corn in Bushels per Acre.	Yield of Stover in Pounds per Acre.	Largeness of Ears.	Percentage of Grain.	Percentage of Cob.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Cocke's Prolific -----		1	1	14	23	22	4	6	24	22	6	9	
Weekley's Improved -----		2	2	16	25	13	13	7	23	13	7	7	
Thomas' Improved -----		3	3	9	11	16	10	17	13	16	23	18	
Sanders' Improved -----		4	4	11	20	5	21	16	14	5	20	11	
Pool's -----		5	5	13	16	5	21	14	16	5	19	23	
Hickory King (Tenn.) -----		6	6	10	22	3	23	20	10	3	5	19	
Holt's Strawberry -----		3	7	3	2	24	2	23	7	24	10	4	
Selection 77 -----		7	8	21	10	12	14	4	26	12	11	4	
Boone County White (Tenn.) -----		7	9	15	7	19	7	15	15	19	13	15	
Hickory King (Va.) -----		12	10	19	18	1	25	12	18	1	14	12	
Marlboro Prolific -----		8	11	17	26	23	3	10	20	23	15	8	
Eureka -----		9	12	8	21	23	3	22	8	23	4	5	
Brake's -----		10	13	5	4	17	9	24	6	17	2	10	
Cocke's Prolific -----		10	14	12	24	18	8	21	9	18	3	6	
McMackin's Gourd Seed -----		13	15	6	5	14	12	27	3	14	8	3	
Boone County Special -----		15	16	21	9	11	15	9	21	11	16	20	
Square Deal -----		14	17	7	6	20	6	25	5	20	1	1	
Riley's Favorite -----		17	18	27	13	6	20	2	28	6	27	23	
Peele's Prolific -----		14	18	1	3	21	5	28	2	21	21	13	
Shellem's Prolific -----		17	19	23	27	7	19	8	22	7	21	22	
Native -----		19	20	18	14	4	22	19	11	4	24	19	
Williams' -----		11	21	4	10	25	1	26	4	25	17	16	
Leaming Yellow -----		16	21	26	17	15	11	3	27	15	25	24	
Craig's Prolific-White -----		21	21	22	15	2	24	13	17	2	18	17	
Mosby's Prolific -----		18	22	2	19	9	17	29	1	9	9	2	
Reid's Yellow Dent -----		21	23	28	16	8	18	1	29	8	26	25	
Boone County White (Ind.) -----		18	23	25	1	16	10	5	25	16	12	21	
Currituck -----		20	23	20	8	9	17	18	12	9	22	14	
Iowa Silver Mine -----		22	24	24	12	10	16	11	19	10	25	26	

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1905—CONTINUED.

IREDELL FARM.

Varieties.	Rank According to the Following Characters.												
	Earliness as Shown by Date of Silking.	Yield of Ear Corn in Pounds per Acre.	Yield of Shelled Corn in Bushels per Acre.	Yield of Stover in Pounds per Acre.	Largeness of Ears.	Percentage of Grain.	Percentage of Cob.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Cocke's Prolific (Edgecombe)---	9	1	1	11	22	9	4	8	23	9	5	6	4
Weekley's Improved-----	12	2	2	2	27	6	7	25	6	6	1	1	4
American Queen-----	9	5	3	17	25	6	7	9	22	6	5	7	7
Thomas' Improved-----	10	4	4	2	9	7	6	27	4	8	5	8	5
Williams'-----	11	6	5	4	3	4	9	17	14	4	4	5	6
Hickory King (Tenn.)-----	7	9	6	8	17	1	12	14	17	1	2	2	7
Brake's-----	10	3	7	18	1	12	1	6	25	12	2	2	7
Pool's-----	5	8	8	9	19	9	4	13	18	9	5	5	3
Cocke's Prolific (Tenn.)-----	9	7	9	20	23	12	1	5	26	12	1	3	4
Shellem's Prolific-----	4	11	10	11	28	7	6	15	16	7	5	4	7
Hickory King (Va.)-----	16	12	11	25	20	6	7	3	28	6	5	3	3
Marlboro Prolific-----	8	10	12	5	24	10	3	22	9	10	6	7	3
Sanders' Improved-----	12	13	13	7	18	6	7	23	8	6	6	5	6
Boone County White (Ind.)-----	7	15	14	23	3	4	9	7	24	4	5	7	7
Boone County Special-----	3	18	15	13	5	3	10	20	11	3	5	7	7
Goodman's Prolific-----	12	20	16	6	16	2	11	28	3	2	2	3	7
Peele's Prolific-----	11	16	17	15	8	6	7	18	13	6	4	3	3
Craig's Prolific-White-----	10	18	18	1	7	5	8	30	1	5	5	7	8
Holt's Strawberry-----	10	14	19	3	2	10	3	29	2	10	4	1	9
Reid's Yellow Dent-----	2	19	20	21	12	6	7	11	20	6	7	8	1
Leaming Yellow-----	2	17	21	14	13	8	5	19	12	8	6	8	2
Currituck-----	10	20	22	10	6	6	7	21	10	6	3	5	7
Square Deal-----	12	22	23	22	4	6	7	10	21	6	1	3	7
Iowa Silver Mine-----	1	23	24	24	12	6	7	4	27	6	6	7	9
Selection 77-----	7	21	25	26	15	11	2	2	29	11	5	7	8
Eureka-----	9	19	26	16	21	12	1	18	13	12	3	7	3
Riley's Favorite-----	2	24	27	27	14	11	2	1	30	11	6	7	3
McMackin's Gourd Seed-----	12	25	28	10	10	9	4	24	7	9	1	3	10
Native-----	12	28	29	19	29	3	10	16	15	3	3	5	5
Boone County White.(Tenn.)--	8	26	30	22	11	11	2	12	19	11	4	7	8
Mosby's Prolific-----	12	27	31	12	26	9	4	26	5	9	5	3	3

TABLE IV—COMPILED RESULTS OF VARIETY TESTS OF CORN, SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER.*

EDGECOMBE FARM.

Varieties.	Number of Years Tested.	Rank According to the Following Characters.									
		Earliness as Shown by Date of Silking.	Yield of Ear Corn in Pounds per Acre.	Yield of Shelled Corn in Bushels per Acre.	Yield of Stover in Pounds per Acre.	Largeness of Ears.	Percentage of Grain.	Percentage of Cob.	Percentage of Ears.	Percentage of Stover.	Smallness in Pounds of Ear Corn Required to Shell Bushel Corn.
Holt's Strawberry -----	3	-----	10	13	3	4	12	4	14	3	12
Marlboro Prolific-----	3	-----	3	4	8	11	14	2	9	8	14
Sanders' Improved-----	3	-----	4	3	7	12	2	14	11	6	2
Cocke's Prolific (Edgecombe) ----	3	-----	1	1	5	14	15	1	4	13	15
Brake's -----	3	-----	9	10	2	2	7	9	15	2	7
Craig's Prolific-White -----	3	-----	15	12	9	9	1	15	13	4	1
Boone County White (Ind.)-----	3	-----	8	9	12	1	11	5	5	12	10
Cocke's Prolific (Tenn.) -----	3	-----	5	6	4	13	13	3	12	5	13
Weekley's Improved-----	3	-----	2	2	6	16	10	6	10	7	9
Iowa Silver Mine-----	3	-----	13	14	14	10	5	11	7	10	6
Leaming Yellow -----	3	-----	11	8	10	7	6	10	6	11	4
Selection 77 -----	3	-----	6	5	15	5	8	8	2	15	8
Boone County White (Tenn.)-----	3	-----	7	7	13	3	12	4	3	14	11
Reid's Yellow Dent -----	3	-----	14	15	11	6	4	12	8	9	5
Mosby's Prolific -----	3	-----	16	16	1	15	3	13	16	1	3
Riley's Favorite-----	3	-----	12	11	16	8	9	7	1	16	9

* The comparison of varieties in this table are the average of the results of the tests of 1903, 1904 and 1905.

TABLE IV—COMPILED RESULTS OF VARIETY TESTS OF CORN, SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER—CONTINUED.

IREDELL FARM.

Varieties.	Number of Years Tested.	Rank According to the Following Characters.											
		Earliness as Shown by Date of Silking.	Yield of Ear Corn in Pounds per Acre.	Yield of Shelled Corn in Bushels per Acre.	Yield of Stover in Pounds per Acre.	Largeness of Ears.	Percentage of Grain.	Percentage of Cob.	Percentage of Ears.	Percentage of Stover.	Smallness in Pounds of Ear Corn Required to Shell Bushel Corn.	Height of Stalks.	Height of Ears. *
Reid's Yellow Dent -----	3	4	11	10	7	5	2	11	9	5	2	4	11
Craig's Prolific-White -----	3	7	3	2	2	3	1	12	11	3	1	6	9
Riley's Favorite -----	3	2	12	12	13	8	7	6	1	13	8	10	10
Boone County White (Tenn.)-----	3	5	7	7	8	7	9	4	6	8	7	9	6
Boone County White (Ind.) -----	3	6	6	5	10	2	6	7	4	10	6	6	8
Sanders' Improved-----	3	9	4	4	6	10	3	10	8	6	3	7	5
Weekley's Improved-----	3	10	1	1	1	13	8	5	10	4	9	2	2
Selection 77 -----	3	6	8	9	11	6	10	3	3	11	10	8	7
Iowa Silver Mine-----	3	1	10	10	12	4	4	9	2	12	4	11	12
Cocke's Prolific (Tenn.)-----	3	7	2	3	5	12	12	1	7	7	12	3	4
Leaming Yellow -----	3	3	9	8	9	9	5	8	5	9	5	12	13
Holt's Strawberry -----	3	8	5	6	3	1	11	2	12	2	11	1	1
Mosby's Prolific -----	3	11	13	11	4	11	4	9	13	1	4	5	3

* Results in this column were obtained from data of 1904 and 1905 tests only.

COMMENTS ON VARIETY TESTS OF CORN.

The variety tests of corn were conducted this year at the Edgecombe and Iredell farms. The land at the Edgecombe farm devoted to this test was a fine sandy loam, underlaid at a depth of from 8 to 12 inches by a moderately stiff yellow sandy clay subsoil, while in Iredell the soil was a fine sandy brownish clay soil with a stiff red clay subsoil. The land at both places was tolerably level and uniform in character. To eliminate all inequalities in the character of the land, if any, the designated varieties at the different farms were planted each in separate rows, arranged consecutively, and this plan was repeated from three to five times, varying with the length of the rows, in order to give the desired acreage to each variety. The varieties are arranged in Table I in the order of their productivity of shelled corn per acre; also the rank in yield of stover per acre is indicated in the second column. In Table II is brought together the results of varietal tests obtained at the Edgecombe farm during 1900, 1901, 1902, 1903, 1904 and 1905, at Red Springs in 1900 and 1901, and at Statesville during 1903, 1904 and 1905.

SOME NOTES ON VARIETIES OF CORN TESTED IN 1905*

Cocke's Prolific, from home-grown seed, ranked second in 1900, 1901 and 1904, and first in 1902, 1903 and 1905 at the Edgecombe farm, while at Red Springs it stood fifth in 1900 and third in 1901.

On the Iredell farm in 1904 Edgecombe-grown seed occupied sixth place and first in 1905.

The yield of Tennessee-grown seed of this variety at Edgecombe was seventh in 1903, twelfth in 1904, and fourteenth in 1905, while it stood fourteenth in 1904 and tenth in 1905 at the Iredell farm.

The results of comparative varietal tests conducted during the past five years on the Test Farms indicate this to be a most substantial and reliable variety; in fact, one of the best varieties thus far tested for growth on the sandy loam soils of the eastern portion of the State. One defect, however, with this variety is that the grains are too short.

Weekley's Improved is a very good variety, having ranked second at the Edgecombe farm as an average of six years' trial. It is tolerably early in maturity and can be grown with more safety than most of the other varieties when only a short growing period is afforded. At the Edgecombe farm it ranked in 1900 third, in 1901 first, in 1902 a close second, but in 1903 and 1904 fell down to tenth and thirteenth places respectively, while in 1905 it assumed second place. In 1901 it was first at Red Springs, and in 1903 sixth, in 1904 tenth,

*The basis of rank in these notes is according to yield of bushels of shelled corn per acre.

and in 1905 second at Iredell. It has a little smaller ear and cob than *Cocke's Prolific*.

Craig's Prolific-White ranked seventh in 1902, eighteenth in 1903, tenth in 1904 and twenty-first in 1905 at the Edgecombe farm, while at the Iredell farm in 1903, 1904 and 1905 it occupied fourth, third and eighteenth places respectively. This and *Craig's Prolific-Strawberry* have the smallest proportion of cobs to grain of any varieties thus far tested. The serious drawbacks to this variety are the chaffy appearance of the grains and the ease with which they are shattered off the cob. *Craig's Prolific-White* generally has deep, well-shaped grains and fills the area on the cob very compactly. It generally yields only about 60 to 70 per cent as much shelled corn as *Cocke's Prolific*, especially in the eastern part of the State.

Sanders' Improved, from Georgia-grown seed, ranked fourth in 1900, third in 1901, fourth in 1902, seventeenth in 1903, third in 1904 and fourth in 1905 at the Edgecombe farm, sixth in 1901 at Red Springs and tenth in 1903, ninth in 1904, and thirteenth in 1905 at Iredell. This variety produces an ear about the size of *Cocke's Prolific*, but contains a smaller cob by about three to six per cent, and consequently requires about three to five pounds less of corn-on-the-ear, as shown by an average of the result of the past five years, to shell a bushel of corn.

Holt's Strawberry occupied first place in 1900, sixth in 1901, sixth in 1902, fifteenth in 1903, twenty-fifth in 1904, and seventh in 1905 at the Edgecombe farm, ninth in 1900 and second in 1901 at Red Springs, eighth in 1903, sixteenth in 1904 and nineteenth in 1905 at Iredell. It has a much larger ear than *Cocke's Prolific* and produces a larger percentage of stover than most other varieties tested.

Brake's, as a result of four years' tests in Edgecombe, the home of the variety, ranked eleventh in 1902, nineteenth in 1903, seventh in 1904 and thirteenth in 1905. At Iredell it occupied first place in the tests of 1904 and seventh in 1905. It has a large ear.

Leaming Yellow ranked twelfth in 1902, fourth in 1903, fifteenth in 1904 and twenty-first in 1905 at the Edgecombe farm, and twelfth in 1903, fourteenth in 1904 and twenty-first in 1905 at Iredell. This is a yellow corn that has a strong tendency to produce only one large ear per stalk. It has yielded excellent results in Indiana, Iowa and Illinois in comparison with other varieties.

Selection 77, from Ohio-grown seed, ranged fifth, sixteenth and eighth at Edgecombe, and eleventh, twelfth and twenty-fifth at Iredell in 1903, 1904 and 1905, respectively. This corn has a larger ear and a little greater percentage shelling capacity than *Cocke's Prolific*.

Riley's Favorite, from Indiana-grown seed, ranked ninth, eighteenth and eighteenth at the Edgecombe farm, and eighth, twenty-second and twenty-seventh at Iredell in 1903, 1904 and 1905, re-

spectively. This is a yellow corn with tolerably small and narrow grains. It has a somewhat larger ear than *Cocke's Prolific*. This is an early-maturing variety.

Boone County White, from Indiana-grown seed, stood in 1903 and 1904 eleventh and twenty-third at Edgecombe, and fifteenth in 1903, eighth in 1904 and fourteenth in 1905 at Iredell; while from Tennessee-grown seed it ranked thirteenth, seventeenth and ninth at Edgecombe in 1903, 1904 and 1905, and seventh in 1904 and thirtieth in 1905 at Iredell. This is a large white-eared variety.

Reid's Yellow Dent, from Illinois-grown seed, ranked twelfth at both the Edgecombe and Iredell farms in 1903, eighteenth and nineteenth in 1904 and twenty-third and twentieth in 1905, respectively. This is a yellow variety of corn that has done well in the Northwestern States, but has a strong tendency, when grown under southern conditions, as indicated by our variety tests, to produce only one large ear per stalk and smaller yields per acre than the two-eared varieties. It is medium early in maturity.

Marlboro Prolific, in 1903 at the Edgecombe and Iredell farms, ranked thirteenth and third, respectively, in 1904 second at Edgecombe, and in 1905 eleventh at Edgecombe and twelfth at Iredell. This variety has an ear a little larger in size than *Cocke's Prolific* and has a decided strong tendency to bear more than one ear to each stalk.

Iowa Silver Mine, from Illinois seed, ranked fourteenth at both Edgecombe and Iredell farms in both 1903 and 1904, and twenty-fourth at both in 1905. This is a white large-eared corn that has a smaller percentage of cob to grain than *Cocke's Prolific*. Its grains are well shaped, showing the effect of prolonged and intelligent breeding and selection. This is one of the earliest variety which the Department has tested.

Mosby's Prolific, from Mississippi-grown seed, ranked fifth in 1900, twelfth in 1903, eighteenth in 1904 and twenty-second in 1905 at Edgecombe, third in 1900 at Red Springs, and seventh in 1903, eighteenth in 1904 and thirty-first in 1905 at Iredell. It has a large proportion of stalk to ear, as it has a large stalk.

Williams' ranked in 1904 fourth and fifteenth and in 1905 twenty-first and fifth at Edgecombe and Iredell, respectively. This variety has a large, tall stalk and large ears that contain a medium high percentage of cob, especially when grown at Iredell. It seems better suited to bottom than upland.

Square Deal, in 1904 and 1905, ranked sixth and seventeenth at Edgecombe, and twenty-first and twenty-third at Iredell in yield of shelled corn per acre. It has a large stalk and a medium to large ear. The shelling capacity of its ears is below the average.

Boone County Special stood ninth and sixteenth in 1904 and sixteenth and fifteenth in 1905, respectively, at the Edgecombe and

Iredell farms. The ears are rather below the medium in size. It, with *Boone County White* (Tenn.), *Iowa Silver Mine*, *Leaming Yellow* and *Riley's Favorite*, were the earliest maturing varieties at the Iredell farm this year.

McMackin's Gourd Seed, in shelled corn, was nineteenth and fifteenth at Edgecombe and twentieth and twenty-eighth at Iredell in 1904 and 1905, respectively. Medium in date of maturity.

Currituck, which is grown rather extensively in some sections of the Piedmont Plateau of North Carolina, ranked in 1904 and 1905 twenty-second and twenty-third, and eleventh and twenty-second at the Edgecombe and Iredell farms, respectively. Its ears are large and contain a medium high percentage of cob to grain. The results at the Iredell farm this year indicate it to be a rather late maturing variety.

Shellem's Prolific ranked at Iredell seventeenth in 1904 and tenth in 1905. At Edgecombe this year it stood in nineteenth place. It has a small ear and is early when grown in western North Carolina.

Eureka, a white corn, ranked in this year's tests in twelfth place at Edgecombe and twenty-sixth at Iredell. It has a comparatively high percentage of cob to grain.

Hickory King, from Tennessee-grown seed, ranked ninth in 1901, sixth in 1903 and 1904 at the Edgecombe farm, and thirteenth in 1903 and sixth in 1905 at Iredell; while from Virginia-grown seed it stood tenth and eleventh, respectively, at the Edgecombe and Iredell farms this year. This variety has small ears with broad, shallow grains. It is a prolific corn.

Pool's occupied fifth place in 1902 and 1905 and eighth in 1903 at Edgecombe, and ninth in 1903 and eighth in 1905 at Iredell. It has a rather small ear, and the results at Iredell this year point to its being rather a prolific variety.

Thomas' Improved ranked fourteenth in 1904 and fourth in 1905 at Iredell and third in 1905 at the Edgecombe farm. It is a vigorous, rank-growing variety that matures rather late.

Peele's Prolific stood in this year's tests eighteenth and seventeenth at the Edgecombe and Iredell farms, respectively.

American Queen at the Iredell farm occupied third place.

Native, Edgecombe County seed, ranked this year at our farm in that locality in twentieth place, while native seed from Iredell County at the Iredell farm produced corn ranking in twenty-ninth place.

CORRELATION OF CHARACTERS OF VARIETIES OF CORN.

One of the purposes of our detailed study of varieties of corn, exhibited in Tables I, III and IV, is to ascertain what characters, being mutually helpful and hence conducive of greater yields, may be expected to be found combined in the same variety, and what ones, being generally antagonistic, seldom or never occur in the same plant

or group of plants. This knowledge is of the most fundamental importance in the proper production of not only corn but all other agricultural crops, as one being familiar with these facts will be better enabled to originate, improve or select varieties best adapted to different localities, soils and purposes. It is also felt that a more correct interpretation can be placed on the results obtained in variety tests.

In Table IV are brought together the average results of the work of three years (1903-'04-'05) at the Edgecombe and Iredell farms separately. From a detailed study of this table, supplemented by field observations, the following tentative inductions are made with reference to varieties of corn studied when they are grown under conditions of soil and climate as represented by these two farms.

Antagonistic Characters.—(1) Earliness in maturity, other things being equal, is not generally conducive to large yields of grain and stover. (2) Large-eared varieties usually have a low percentage of grain to cob and are as a rule less productive of shelled corn per acre. (3) Ears with very small cob have poorly-shaped kernels and give a small amount of shelled corn per ear, and *vice versa*. (4) Kernels of low vitality do not tend to the growth of plants of maximum yields.

Associated Characters.—(1) Earliness, other things being equal, usually tends to high percentage of ear to stover, and *vice versa*, although this ratio is more or less modified by season, soil, fertilization and breeding. (2) Varieties producing two ears per stalk are generally more productive of shelled corn per acre than those bearing only one ear, although it may be a large one. (3) Medium maturity, other things being equal, tends to increase yields per acre of grain. (4) Small kernels usually possess low vitality. (5) Kernels with small germs (chits) contain a small percentage of oil or fat. (6) Varieties with good root and leaf development are usually the most resistant ones to drought and disease and insect ravages.

SELECTING SEED FOR IMPROVEMENT.

In the improvement of corn by seed selection an endeavor should be made to start with the best variety as ascertained by actual tests in the field through a sufficient number of years to eliminate weather conditions. It must be borne in mind that in all plant improvement the same principles and practices that have been employed with such striking results in the improvement of the different breeds of animals must be followed.

For corn there are three general methods of improvement: First, by importation of seed from some reputable breeder or grower; second, by the careful selection of seed corn from one's own field or from a neighbor's; third, by careful selection and growing of seed corn in a field isolated something like four or five hundred yards from any other corn-field.

The characters that should be taken into account in the improvement of corn by selection are:

(1) Selection of ears from stalk bearing two or more ears, as it has been demonstrated time and again that a variety that bears two medium-sized ears per stalk will generally give higher yields of shelled corn per acre than a variety bearing one large ear to the stalk.

(2) The stalk should be large at the base and tapering gradually towards the tassel, for two reasons: First, because it will be better enabled to withstand drought, and, second, because it will stand up better in wind-storms.

(3) The ears should by all means be of a cylindrical form, with both butts and tips filled out, as this is the form that gives the highest percentage of yield of shelled corn per ear, other things being equal.

(4) The best-shaped kernel is a medium wedge, as this fills out the space on the cob most completely. Also, the distance between the rows of grains should be small, while the number of rows should be large and run parallel the full length of the cob, with little or no diminution in size, either at the butts or tips. The percentage of grains should be from 80 to 90 and should be held rigidly by the cob. It should also possess a high (90 to 95 per cent.) germinating power and great resisting power to disease and insect ravages.

It should be kept clearly in mind that, with varieties of corn, selection should be made particularly with reference to total yield of shelled corn and the characters which tend to give this and an improved quality of grains. If it is to be used in feeding growing animals, or to be ground into meal for human consumption, it should be high in flesh and muscle-forming material (protein); if for fattening stock, high in fat, and if to manufacture whiskey, alcohol or starch, high in starch, sugar, etc. (carbohydrates).

SOURCES OF VARIETIES OF CORN TESTED.

The seed used in the variety test of corn at the Edgcombe and Statesville farms this year were obtained from the following sources:

American Queen.....	R. P. Dalton, Danville, Va.
Boone County White (Indiana) ..	Bureau of Plant Industry, Washington, D. C.
Boone County White (Tennessee) ..	Bureau of Plant Industry, Washington, D. C.
Boone County Special (Illinois) ..	Bureau of Plant Industry, Washington, D. C.
Brake's.....	Joe L. Brake, Rocky Mount, N. C.
Cocke's Prolific.....	Edgcombe Test Farm, Rocky Mount, N. C.
Cocke's Prolific (Tennessee).....	Bureau of Plant Industry, Washington, D. C.
Craig's Prolific White.....	W. R. Craig, Waxhaw, N. C.
Currituck.....	Thomas Wooten, Statesville, N. C.
Eureka.....	T. W. Wood & Sons, Richmond, Va.
Hickory King.....	A. O. Lee, Bartee, Va.
Hickory King (Tennessee).....	Bureau of Plant Industry, Washington, D. C.
Holt's Strawberry.....	T. W. Wood & Sons, Richmond, Va.
Iowa Silver Mine (Illinois).....	Bureau of Plant Industry, Washington, D. C.
Leaming Yellow (Ohio).....	Bureau of Plant Industry, Washington, D. C.
Marlboro Prolific (S. C.).....	Bureau of Plant Industry, Washington, D. C.

McMackin's Gourd Seed (Tenn.)	Bureau of Plant Industry, Washington, D. C.
Mosby's Prolific (Mississippi)	Bureau of Plant Industry, Washington, D. C.
Native	Porter Watts, Statesville, N. C.
Native	John Pitt, Rocky Mount, N. C.
Peele's Prolific	Albert Peele, Guilford College, N. C.
Pool's	J. C. Pool, Marion, N. C.
Reid's Yellow Dent (Illinois)	Bureau of Plant Industry, Washington, D. C.
Riley's Favorite (Indiana)	Bureau of Plant Industry, Washington, D. C.
Sanders' Improved (Georgia)	Bureau of Plant Industry, Washington, D. C.
Selection 77 (Ohio)	Bureau of Plant Industry, Washington, D. C.
Shellem's Prolific	George Shellem, Raleigh, N. C.
Square Deal	Square Deal Farm and Nursery, Wilmington, N. C.
Thomas' Improved	R. P. Thomas, Bethlehem, N. C.
Weekley's Improved	Iredell Test Farm, Statesville, N. C.
Williams'	C. S. Williams, Franklinton, N. C.

RESULTS OF VARIETY-DISTANCE TESTS OF CORN.

The results of these tests are included in the following table:

TABLE V—RESULTS OF TESTS OF THREE LEADING VARIETIES OF CORN AT DIFFERENT SPACING IN THE ROWS.

EDGEcombe FARM.

Varieties.	Yield, Height of Stalks and Ears at Different Spacing of Stalks in Four Foot Rows.														
	20 Inches.			24 Inches.			30 Inches.			36 Inches.			40 Inches.		
	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.
Cocke's Prolific-----	120.0	61.5	27.3	115.0	65.0	35.6	125.9	67.8	38.3	122.9	63.8	27.0	125.4	58.5	30.1
Holt's Strawberry-----	126.5	63.8	17.7	130.2	64.0	23.5	131.2	66.8	22.3	131.6	63.8	23.1	129.0	67.0	25.7
Weekley's Improved-----	107.8	53.0	23.5	120.9	63.0	32.7	122.9	64.8	38.7	125.0	66.5	38.7	119.0	58.8	34.7

IREDELL FARM.

Cocke's Prolific-----	123.0	57.0	36.1	120.0	54.0	33.4	120.0	54.0	40.7	126.0	57.0	44.0	123.0	54.0	42.8
Holt's Strawberry-----	132.0	72.0	24.4	126.0	72.0	30.0	120.0	69.0	34.5	114.0	72.0	34.1	120.0	66.0	39.8
Weekley's Improved-----	126.0	63.0	30.3	126.0	63.0	36.7	129.0	60.0	43.1	126.0	60.0	44.0	123.0	60.0	40.8

COMMENTS ON VARIETY-DISTANCE TESTS.

These tests at the respective farms were conducted on the same types of soil that the respective variety tests were. The tests were planned and put out to ascertain if the claim made by some that if distance is given the large one-eared varieties they will produce

larger yields of shelled corn per acre than those producing or tending to produce two small or medium-sized ears per stalk. For the test, as is seen above, two well-known prolific varieties—*Cocke's Prolific* and *Weekley's Improved*—are compared with *Holt's Strawberry*, one of the best one-eared varieties. It will be noted that both *Cocke's Prolific* and *Weekley's Improved* give larger yields than *Holt's Strawberry*, at both Edgecombe and Iredell, at all the different distancing of the hills in the row that were tried. At the Edgecombe farm *Cocke's Prolific* produced the following increase of bushels of shelled corn over *Holt's Strawberry*: At 20 inches, 9.6; at 24 inches, 12.1; at 30 inches, 14.0; at 36 inches, 3.9; at 40 inches, 4.0 bushels; while at Iredell the increased yields were 11.7, 3.4, 6.2, 9.9 and 3.0 bushels per acre at the respective distances.

Weekley's Improved increased yields over *Holt's Strawberry* were: At Edgecombe, 10.8 bushels at 20 inches, 9.2 at 24 inches, 16.4 at 30 inches, 15.6 at 36 inches, and 9.0 at 40 inches; while at Iredell the increases were 5.9, 6.7, 8.6, 9.9 and 1.0 bushels.

In the light of these results, coupled with five years variety tests, it is evident that the largest yields of shelled corn per acre on any type of soil are going to result from the use of the more prolific varieties, because they will produce more shelled corn per stalk, and, as the stalks are generally smaller and can be planted closer in the row, will contain more stalks per acre.

When the corn is planted wide apart in the row and in wide-apart rows—matters not if the best one-eared varieties are used—the land will not “turn out” the maximum yield which it is capable of producing, for the reason that there are not enough stalks per acre.

As seen in Table V, *Cocke's Prolific* and *Weekley's Improved*, at both Edgecombe and Iredell, produced their largest yields in these tests at the distancing centering about 30 to 36 inches, while *Holt's Strawberry* did best at the greatest distancing. At the most favorable distancing (40 inches) *Holt's Strawberry* at the Edgecombe and Iredell farms yielded less by 12.6 and 4.2 bushels of shelled corn per acre, respectively, than *Cocke's Prolific* at the distancing best suited to it, which were 30 and 36 inches, respectively. *Weekley's Improved*, with its best distancing at Edgecombe, yielded 13 bushels more than *Holt's Strawberry* at 40-inch distancing; while at Iredell *Weekley's Improved*, with the stalks 36 inches in the row, produced 4.2 bushels more per acre than *Holt's Strawberry* at its optimum distancing (40 inches) in the row.

DISTANCE TESTS OF CORN.

The results of the distance tests of corn are brought together in Tables VI and VII, which follow:

TABLE VI—RESULTS OF DISTANCE TESTS OF CORN.

EDGECOMBE FARM.

Size of Plats in Parts of Acre.	Distance Between Rows.	Distance Between Stalks in Rows.	No. Stalks per Plat.		Number Ears per Plat.	Average Height of Stalks in Inches at Maturity.	Yield per Plat in Pounds.				Total Bushels Shelled Corn per Acre.	Pounds Shelled Corn per Stalk.
			For Perfect Stand.	By Actual Count.			Large Ears.	Nubbins.	Total Corn on Cob.	Stover.		
.1639	Three and one-half feet.	Four feet-----	510	471	----	118.7	320.0	22.0	342.0	418.0	29.6	.58
.1639	Three and one-half feet.	Three feet-----	680	608	----	127.7	240.0	22.0	262.0	378.0	22.7	.34
.1639	Three and one-half feet.	Two and one-half feet.	804	731	----	128.0	171.0	30.0	201.0	379.0	17.4	.22
.1639	Three and one-half feet.	Two feet-----	1020	960	----	127.8	155.0	31.0	186.0	409.0	16.1	.15
.1873	Four feet-----	Four feet-----	510	462	----	124.8	212.0	20.0	232.0	313.0	17.6	.40
.1873	Four feet-----	Three feet-----	680	618	----	125.6	187.0	22.0	209.0	371.0	15.8	.27
.1873	Four feet-----	Two and one-half feet.	804	769	----	136.0	209.5	32.0	241.5	433.5	18.3	.25
.1873	Four feet-----	Two feet-----	1020	929	----	125.6	193.0	46.0	239.0	431.0	18.1	.20
.1873	Four feet-----	One and one-half feet.	1360	1222	----	125.6	178.0	89.0	167.0	668.0	12.7	.11
.2342	Five feet-----	Four feet-----	510	468	----	122.6	300.0	39.0	339.0	421.0	20.6	.58
.2342	Five feet-----	Three feet-----	680	619	----	129.6	356.5	38.0	394.5	475.5	20.4	.51
.2342	Five feet-----	Two feet-----	1020	916	----	124.4	377.0	53.0	430.0	560.0	26.1	.37
.2342	Five feet-----	One and one-half feet.	1360	1227	----	129.0	303.0	46.0	349.0	581.0	22.9	.23

IREDELL FARM.

.0438	Three and one-half feet.	Four feet-----	136	140	300	120.0	102.5	7.0	109.5	90.5	39.1	.69
.0438	Three and one-half feet.	Three feet-----	182	165	310	120.0	103.5	3.0	106.5	118.5	38.0	.57
.0438	Three and one-half feet.	Two and one-half feet.	218	220	380	126.0	100.5	4.0	104.5	85.5	37.3	.47
.0438	Three and one-half feet.	Two feet-----	272	240	410	120.0	80.0	8.0	88.0	132.0	31.4	.32
.0500	Four feet-----	Four feet-----	136	135	325	114.0	107.5	4.0	111.5	78.5	34.8	.72
.0500	Four feet-----	Three feet-----	182	175	390	120.0	104.5	6.0	110.5	134.5	34.5	.55
.0500	Four feet-----	Two and one-half feet.	218	225	465	120.0	108.0	11.0	119.0	191.0	37.2	.46
.0500	Four feet-----	Two feet-----	272	260	340	120.0	101.0	8.0	109.0	126.0	34.1	.37
.0500	Four feet-----	One and one-half feet.	363	275	400	123.0	114.5	4.0	118.5	126.5	37.0	.38
.0625	Five feet-----	Four feet-----	136	145	360	126.0	130.0	5.0	135.5	104.5	33.9	.82
.0625	Five feet-----	Three feet-----	182	180	440	132.0	142.0	5.0	147.0	138.0	35.0	.71
.0625	Five feet-----	Two feet-----	272	250	570	120.0	174.0	13.5	187.5	152.5	46.9	.66
.0625	Five feet-----	One and one-half feet.	363	276	530	132.0	222.0	9.0	231.0	219.0	57.8	.73

TABLE VII—COMPILED RESULTS OF DISTANCE TESTS OF CORN.

EDGECOMBE FARM.

Year.	Yield of Shelled Corn in Bushels per Acre at Different Distancing.												
	3½ feet by 2 feet.	3½ feet by 3 feet.	3½ feet by 3½ feet.	3½ feet by 4 feet.	4 feet by 1½ feet.	4 feet by 2 feet.	4 feet by 2½ feet.	4 feet by 3 feet.	4 feet by 3½ feet.	4 feet by 4 feet.	5 feet by 2 feet.	5 feet by 3 feet.	5 feet by 4 feet.
1901 -----						23.6		28.4		24.4	22.5	24.3	23.0
1902 -----		18.8	16.1	14.6			17.6	16.1		16.2		13.0	13.6
1903 -----	22.0		26.8	23.7			27.4	23.0		25.4	24.6	19.5	18.7
1904 -----	36.8	37.4		37.4	35.8	33.7	35.8	40.1		30.2	32.7	32.8	31.9
1905 -----	16.1	22.7		29.6	12.7	18.1	18.3	15.8		17.6	26.1	20.4	20.6
Averages -----								24.7		22.8		22.0	21.6

RED SPRINGS FARM.

1901 -----			9.2		10.0		10.7		16.2	20.0	17.9	18.3
1902 -----			14.8		11.9		14.4		11.4	12.2	11.3	10.9
1903 -----			17.8		18.3		16.5		18.2	17.6	19.2	14.4
1904 -----			23.3						21.8		23.6	20.8
Averages -----			16.3							18.4	17.3	

IREDELL FARM.

1903 -----	15.8	21.9	18.0	22.9	14.5	16.4	17.1		15.4	19.8	20.5	19.8
1904 -----	42.4	39.3	40.6	36.4	35.1	39.3	35.4		41.0	46.9	37.2	31.0
1905 -----	31.4	38.0	39.1	37.0	34.1	37.2	34.5		34.8	46.9	35.0	33.9
Averages -----	29.8	33.0	32.5	32.1	27.9	31.0	29.0		30.4	37.9	30.9	28.2

COMMENTS ON DISTANCE TESTS.

These tests this year were conducted at the Edgecombe and Iredell farms, using seed of *Cocke's Prolific* at Edgecombe and of *Weekley's Improved* at Iredell for planting the different tests. The distancing best suited to the Edgecombe farm in its present state of fertility, as indicated by an average of five years' results, is 4 by 3 feet; while at Iredell, as the average of three years' results, 5 by 2 feet afforded the highest yield. It will require a number of repetitions of this test to arrive at a fair idea of the best width of rows and distance in rows for planting corn on the types of soil used in the experiments. This will no doubt vary with the different kinds of corn, soil and season.

In Table VII is presented in concise form the results of all distance tests with corn at the Edgecombe and Red Springs farms during the past five years, and at Iredell during the past three years, that have been conducted by the Department.

II. VARIETY AND DISTANCE TESTS OF COTTON.

Preparation and Cultivation.—All plats devoted to these tests were broke 8 to 10 inches deep during the middle of March at Edgecombe and in January at Iredell with a two-horse turning-plow, followed by a thorough disking during the middle of April at Edgecombe and on the first of May at Iredell. Just before laying off the rows, which was from the last of April to the middle of May, the ground was "gone over" with a smoothing harrow. The rows were run 5 to 7 inches deep with an 8-inch shovel, and the fertilizer materials applied in the drill at the following rate per acre in all tests:

Four hundred pounds of a mixture of acid phosphate, manure salt and dried blood, which contained 7 per cent available phosphoric acid, $2\frac{1}{2}$ per cent potash and $2\frac{1}{2}$ per cent nitrogen (equal to 3.04 per cent ammonia), costing \$4.12, were used.

The cultivation was level with cultivators, being moderately deep at the beginning of the season and shallower as the root zone increased. The cultivator was never run more than twice to the row at a time, as this more than covered the middle, and an effort was made to work over the plats as quickly as possible immediately after rains to break the crust formed by the showers and leave a dust mulch to check evaporation. The cultivator was run about $1\frac{1}{2}$ to 2 inches deep toward the close of the season. It was attempted to cultivate every ten days, which had to be changed, of course, to suit the season.

RESULTS OF VARIETY TESTS OF COTTON.

The results of these tests are included in the following tables:

TABLE VIII—RESULTS OF

EDGECOMBE

Rank According to Selling Price of Total Products (Lint and Seed).	Varieties Tested.	Number of Stalks per Plat.		Average Height of Stalks in Inches at Maturity.	Yield of Seed Cotton in Pounds per Plat at the Several Pickings.			
		For Perfect Stand.	By Actual Count.		First Picking— October 2.	Second Picking— November 16.	Third Picking— January 20.	Total Picking.
1	Excelsior Prolific-----	531	497	-----	48.50	36.50	4.25	89.25
2	Culpepper's Improved-----	531	530	-----	50.25	42.50	8.00	100.75
3	Russell's Big Boll -----	531	555	-----	48.25	48.50	9.75	106.50
4	Hodge-----	531	472	-----	66.00	27.00	3.75	96.75
5	Cook's Improved -----	531	587	-----	56.75	28.00	4.00	88.75
6	Peterkin's Improved -----	531	524	-----	37.00	41.50	7.75	86.25
7	Tool's Early Prolific-----	531	498	-----	44.50	37.00	3.25	84.75
8	Moss' Improved -----	531	582	-----	39.50	33.00	9.00	81.50
9	Black Texas Wood -----	531	583	-----	35.25	43.00	10.50	88.75
10	Edgewood-----	531	541	-----	49.75	37.50	6.25	93.50
11	Butler's Early Prolific-----	531	504	-----	48.50	41.00	4.25	93.75
12	Jackson Limbless -----	531	445	-----	35.50	34.00	8.50	78.00
13	Layton's Improved -----	531	490	-----	43.00	31.75	3.25	78.00
14	Gold Standard -----	531	452	-----	42.75	36.00	4.75	83.50
15	Shine's Extra Early Prolific-----	531	523	-----	60.50	29.00	4.50	94.00
16	Wilson's Matchless-----	531	519	-----	45.75	33.25	6.25	85.25
17	Webb-----	531	361	-----	53.00	23.50	9.25	85.75
18	Peterkin's Improved (Craig's) -----	531	611	-----	49.00	24.00	3.00	76.00
19	Braswell's Cluster -----	531	458	-----	44.00	30.50	2.75	77.25
20	Dozier's Improved-----	531	425	-----	61.00	7.75	1.75	70.50
21	Truitt's Improved-----	531	479	-----	35.50	29.50	6.00	71.00
22	Berry's Big Boll-----	531	460	-----	50.00	22.50	3.50	76.00
23	Jackson Limbless, No. 128-1-29-1-11 -----	531	430	-----	29.00	24.50	6.50	60.00

VARIETY TESTS OF COTTON.

FARM.

Total Pounds Seed Cotton per Acre.	Number of Bolls Required to Yield One Pound of Seed Cotton.	Number of Seed in One Pound of Seed Cotton.	Pounds of Lint in 100 Pounds of Seed Cotton.	Pounds of Seed in 100 Pounds of Seed Cotton.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 10 Cents per Pound.	Value of Seed per Acre at 80 Cents per 100 Pounds or 24 Cents per Bushel.	Total Value of Lint and Seed per Acre.
1756.89	83	2939*	40.93	59.07	719.10	1037.79	\$ 71.91	\$ 8.30	\$ 80.21
1983.27	59	2940	35.26	64.74	699.30	1283.97	69.93	10.27	80.20
2096.46	50	1986*	32.56†	67.44†	682.61	1413.85	68.26	11.31	79.57
1904.53	91	2925	35.22	64.78	670.77	1233.76	67.08	9.87	76.95
1747.05	62	2430	39.03	60.97	681.87	1065.18	68.19	8.52	76.71
1697.83	74	3108*	39.57†	60.43†	671.83	1026.00	67.18	8.21	75.39
1668.31	82	3059	39.77	60.23	663.49	1004.82	66.35	8.04	74.39
1604.55	89	3433	41.57	58.43	667.01	937.54	66.70	7.50	74.20
1747.05	85	3365	37.19	62.81	649.73	1097.32	64.97	8.78	73.75
1840.55	71	2480	33.99	66.01	625.60	1214.95	62.56	9.72	72.28
1845.47	83	3552	33.65	66.35	621.00	1224.47	62.10	9.80	71.90
1535.43	72	-----	41.37‡	58.63‡	635.21	900.22	63.52	7.20	70.72
1535.43	87	3324	39.98	60.02	613.86	921.57	61.39	7.37	68.76
1643.70	83	3138	36.62	63.38	601.92	1041.78	60.19	8.33	68.52
1850.39	82	2714*	30.82†	69.18†	570.29	1280.10	57.03	10.24	67.27
1678.15	-----	-----	34.67‡	65.33‡	581.81	1096.34	58.18	8.77	66.95
1687.99	84	3154	33.95	66.05	573.07	1114.92	57.31	8.92	66.23
1496.06	102	3388	35.39	64.61	529.46	966.60	52.95	7.73	60.68
1520.67	85	3724	34.10	65.90	518.54	1002.13	51.85	8.02	59.87
1387.80	89	-----	35.68‡	64.32‡	495.17	892.63	49.52	7.14	56.66
1397.64	58	2548	35.06	64.94	490.01	907.63	49.00	7.26	56.26
1496.06	62	2250	30.54	69.46	456.90	1039.16	45.69	8.31	54.00
1181.10	72	3364	40.16	59.84	474.33	706.77	47.43	5.65	53.08

* These figures are the results of 1904 tests at this farm.

† These figures are the average of all results secured during previous years with this variety at this farm.

‡ These results are from Iredell crop, as no separation of lint and seed of these varieties was made at the Edgecombe farm this year.

TABLE VIII—RESULTS OF VARIETY

IREDELL

Rank According to Selling Price of Total Products (Lint and Seed).	Varieties Tested.	Number of Stalks per Plat.			Yield of Seed Cotton in Pounds per Plat at the Several Pickings.			
		For Perfect Stand.	By Actual Count.	Average Height of Stalks in Inches at Maturity.	First Picking— October 12.	Second Picking— November 23.	Third Picking.	Total Picking.
1	King's Improved (Native) -----	523	537	41	30.27	19.00	-----	49.27
2	Hodge -----	523	654	28	22.10	32.00	-----	54.10
3	Cook's Improved -----	523	612	37	12.40	34.50	-----	46.90
4	Culpepper's Improved -----	523	563	32	11.70	37.00	-----	48.70
5	Webb -----	523	649	40	17.55	29.75	-----	47.30
6	Wilson's Matchless -----	523	647	34	12.78	35.50	-----	48.28
7	Shine's Extra Early Prolific -----	523	606	36	15.08	31.25	-----	46.33
8	Butler's Early Prolific -----	523	641	34	14.73	30.00	-----	44.73
9	Dozier's Improved -----	523	667	28	27.04	17.50	-----	44.58
10	Excelsior Prolific -----	523	690	32	7.58	32.50	-----	40.08
11	King's Improved -----	523	627	32	18.26	20.00	-----	38.26
12	Edgewood -----	523	675	31	10.35	33.25	-----	43.65
13	Tool's Early Prolific -----	523	591	36	5.93	35.00	-----	40.93
14	Layton's Improved -----	523	673	40	7.31	32.25	-----	39.56
15	Black Texas Wood -----	523	553	33	7.29	33.00	-----	40.29
16	Gold Standard -----	523	631	34	6.61	32.75	-----	39.36
17	Berry's Big Boll -----	523	595	40	17.98	27.50	-----	45.48
18	Moss' Improved -----	523	660	30	3.31	32.00	-----	35.31
19	Jackson Limbless -----	523	623	45	3.51	32.50	-----	36.01
20	Peterkin's Improved -----	523	672	29	7.17	30.00	-----	37.17
21	Peterkin's Improved (Craig's) -----	523	641	26	9.98	29.25	-----	39.23
22	Truitt's Improved -----	523	647	32	7.53	30.00	-----	37.53
23	Jackson Limbless, No. 128-1-29-1-11 -----	523	575	45	2.67	25.25	-----	27.92

TESTS OF COTTON—CONTINUED.

FARM.

Total Pounds Seed Cotton per Acre.	Number of Bolls Required to Yield One Pound of Seed Cotton.	Number of Seed in One Pound of Seed Cotton.	Pounds of Lint in 100 Pounds of Seed Cotton.	Pounds of Seed in 100 Pounds of Seed Cotton.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 10 Cents per Pound.	Value of Seed per Acre at 80 Cents per 100 Pounds or 24 Cents per Bushel.	Total Value of Lint and Seed per Acre.
985.40	98	2881	39.19	60.81	386.18	599.22	38.62	4.79	43.41
1082.00	91	2961	33.88	66.12	366.58	715.42	36.66	5.72	42.38
938.00	77	2339	37.61	62.39	352.78	585.22	35.28	4.68	39.96
974.00	69	2006	34.42	65.58	335.25	638.75	33.53	5.11	38.64
946.00	95	2952	35.68	64.32	337.53	608.47	33.75	4.87	38.62
965.60	78	2971	34.67	65.33	334.77	630.83	33.48	5.05	38.53
926.60	93	2731	34.48	65.52	319.49	607.11	31.95	4.86	36.81
894.60	102	3374	35.97	64.03	321.79	571.81	32.18	4.58	36.76
890.80	96	3302	35.68	64.32	317.84	572.96	31.78	4.58	36.36
801.60	93	3245	39.49	60.51	316.55	485.05	31.66	3.88	35.54
765.20	99	2901	41.45	58.55	317.18	448.02	31.72	3.58	35.30
873.00	74	2419	35.21	64.79	307.38	565.62	30.74	4.52	35.26
818.60	85	3370	37.86	62.14	309.92	508.68	30.99	4.07	35.06
791.20	94	3171	39.42	60.58	311.89	479.31	31.19	3.83	35.02
805.80	96	3544	37.01	62.99	298.23	507.57	29.82	4.06	33.88
787.20	90	2891	37.36	62.64	294.10	493.10	29.41	3.94	33.35
909.60	68	2306	20.32	69.68	275.79	633.81	27.58	5.07	32.65
706.20	94	3154	41.03	58.97	289.75	416.45	28.98	3.33	32.31
720.20	99	3666	38.23	61.77	275.33	444.87	27.53	3.56	31.09
743.40	85	3405	36.41	63.59	270.67	472.73	27.07	3.78	30.85
784.60	102	3767	32.59	67.41	255.70	528.90	25.57	4.23	29.80
750.60	65	2261	33.33	66.67	250.17	500.43	25.02	4.00	29.02
558.40	85	3121	37.11	62.89	207.22	351.18	20.72	2.81	23.53

TABLE IX—COMPILED RESULTS OF VARIETY TESTS OF COTTON.

EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Russell's Big Boll	1265.0	3	1487.0	1	1675.0	1	1193.7	7	1941.3	4	2096.5	3	1609.8	1
Culpepper's Improved	1125.6	4	1302.0	3	1230.0	5	1028.5	9	2031.3	1	1933.3	2	1450.1	2
Moss' Improved	1305.0	1	999.0	6					1287.9	17	1604.6	8		
Breeden's Prolific	1205.0	2												
Todd's Improved	1000.0	5												
Strickland's Improved	950.0	6	1142.0	4										
Lewis' Prize	770.0	7												
Hawkins' Prolific	740.0	8	1053.0	5										
Peterkin's Improved			1215.0	2	1372.5	2	1291.3	4	1363.6	16	1697.8	6	1388.0	3
Griffin's Improved			957.0	7										
Truitt's Improved					1335.0	3	1036.0	8			1397.6	21		
Daughtridge's					1230.0	4	1336.3	6						
Blue Ribbon					1170.0	6								
King's Improved					885.0	7	1381.4	3	1747.2	3				
Excelsior Prolific							1621.6	2	1761.4	7	1756.9	1		
Edgewood							1691.6	1	1733.0	10	1840.6	10		
Garrard's Improved Prolific.							1332.3	5						
Cook's Improved									1818.2	2	1747.5	5		
Hodge									1756.6	5	1904.5	4		
Mebane's Triumph									1775.6	6				
Webb									1780.3	8	1688.0	17		
Tool's Early Prolific									1666.7	9	1668.3	7		
Shine's Extra Early Prolific.									1728.2	11	1850.4	15		
Texas Big Boll									1643.0	12				
Speight's Prolific									1524.6	13				
Brown Texas Wood									1415.7	14				
Black Texas Wood									1543.6	15	1747.5	9		
Missionary									1572.0	18				
Peterkin's Improved (Craig's).									1534.1	19	1496.6	18		
White's Long Staple									1548.3	20				
Florodora									1306.8	21				

TABLE IX—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

EDGECOMBE FARM.

Varieties Tested.	1900. Yield in Pounds Seed Cotton per Acre. Rank According to Value of Total Products.	1901. Yield in Pounds Seed Cotton per Acre. Rank According to Value of Total Products.	1902. Yield in Pounds Seed Cotton per Acre. Rank According to Value of Total Products.	1903. Yield in Pounds Seed Cotton per Acre. Rank According to Value of Total Products.	1904. Yield in Pounds Seed Cotton per Acre. Rank According to Value of Total Products.	1905. Yield in Pounds Seed Cotton per Acre. Rank According to Value of Total Products.	Averages. Yield in Pounds Seed Cotton per Acre. Rank According to Value of Total Products.
Wilson's Matchless-----						1678.2	16
Jackson Limbless (Wilt Resistant).						1535.4	12
Jackson Limbless (No. 123-1-29-1-11).						1181.1	23
Dozier's Improved-----						1387.8	20
Berry's Big Boll-----						1496.6	22
Layton's Improved-----						1535.4	13
Gold Standard-----						1643.7	14
Braswell's Cluster-----						1520.7	19
Butler's Early Prolific-----						1845.5	11

TABLE IX—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

RED SPRINGS FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Russell's Big Boll -----	675.0	3	496.3	1	1070.0	3	887.9	7	557.6	5	737.4	4
Culpepper's Improved (Edgecombe). -----	734.4	1	477.0	2	1218.5	1	897.2	4	-----	-----	831.8	1
Culpepper's Improved (Red Springs). -----	-----	-----	-----	-----	-----	-----	915.9	3	635.2	2	-----	-----
Peterkin's Improved ----	660.0	2	440.0	4	982.5	2	915.9	2	441.4	10	688.0	5
Daughtry's Excelsior ----	655.0	4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Allen's Long Staple ----	635.0	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Excelsior Prolific -----	635.0	6	-----	-----	895.0	5	943.9	1	548.0	3	755.5	2
Texas Burr -----	630.0	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Groveton -----	605.0	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Native -----	530.0	8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Griffin's Improved -----	-----	-----	473.1	3	-----	-----	-----	-----	-----	-----	-----	-----
Hawkins' Prolific -----	-----	-----	448.3	5	-----	-----	-----	-----	-----	-----	-----	-----
Moss' Improved -----	-----	-----	417.0	6	-----	-----	-----	-----	334.5	17	-----	-----
Sea Island -----	-----	-----	255.0	7	-----	-----	-----	-----	-----	-----	-----	-----
King's Improved -----	-----	-----	-----	-----	910.0	4	813.1	6	500.5	6	741.2	3
Peterkin's Improved (Craig's). -----	-----	-----	-----	-----	-----	-----	-----	-----	347.7	19	-----	-----
Truitt's Improved -----	-----	-----	-----	-----	-----	-----	411.2	8	-----	-----	-----	-----
Edgewood -----	-----	-----	-----	-----	-----	-----	925.2	5	491.0	9	-----	-----
Cook's Improved -----	-----	-----	-----	-----	-----	-----	-----	-----	680.4	1	-----	-----
Tool's Early Prolific ----	-----	-----	-----	-----	-----	-----	-----	-----	490.1	4	-----	-----
Webb -----	-----	-----	-----	-----	-----	-----	-----	-----	503.2	7	-----	-----
Hodge -----	-----	-----	-----	-----	-----	-----	-----	-----	494.9	8	-----	-----
Speight's Prolific -----	-----	-----	-----	-----	-----	-----	-----	-----	431.0	11	-----	-----
Shine's Extra Early Prolific. -----	-----	-----	-----	-----	-----	-----	-----	-----	452.6	12	-----	-----
Black Texas Wood -----	-----	-----	-----	-----	-----	-----	-----	-----	413.6	13	-----	-----
Brown Texas Wood -----	-----	-----	-----	-----	-----	-----	-----	-----	382.5	14	-----	-----
Missionary -----	-----	-----	-----	-----	-----	-----	-----	-----	396.4	15	-----	-----
Texas Big Boll -----	-----	-----	-----	-----	-----	-----	-----	-----	392.7	16	-----	-----
White's Long Staple ----	-----	-----	-----	-----	-----	-----	-----	-----	383.7	18	-----	-----
Florodora -----	-----	-----	-----	-----	-----	-----	-----	-----	312.1	20	-----	-----

TABLE IX—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

IREDELL FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
King's Improved (Native).							750.0	1	900.0	2	985.4	1	878.5	1
King's Improved							655.0	2	1005.0	1	765.2	11	808.4	2
Russell's Big Boll							640.0	3	835.0	7				
Culpepper's Improved							630.0	5	790.0	8	974.0	4	798.0	3
Edgewood							605.0	4	760.0	11	873.0	12	746.0	4
Excelsior Prolific							475.0	6	790.0	6	801.6	10	688.9	5
Garrard's Improved Prolific.							410.0	7						
Truitt's Improved							360.0	9			750.6	22		
Peterkin's Improved							290.0	8	495.0	21	743.4	20	509.5	6
Webb									920.0	3	946.0	5		
Hodge									805.0	4	1082.0	2		
Tool's Early Prolific									575.0	17	818.6	13		
Cook's Improved									695.0	10	938.0	3		
Missionary									745.0	9				
Speight's Prolific									660.0	13				
Shine's Extra Early Prolific.									825.0	5	926.6	7		
Texas Big Boll									635.0	16				
Black Texas Wood									525.0	20	805.8	15		
Peterkin's Improved (Craig's).									670.0	15	784.6	21		
Moss' Improved									500.0	19	706.2	18		
White's Long Staple									525.0	24				
Brown Texas Wood									615.0	12				
Florodora									440.0	25				
Jackson Limbless									465.0	23				
Mebane's Triumph									460.0	22				
Jones's Improved									600.0	18				
Excelsior									650.0	14				
Wilson's Matchless											965.6	6		
Jackson Limbless (Wilt Resistant).											720.2	19		
Jackson Limbless (No. 128-1-29-1-11).											558.4	23		
Dozier's Improved											890.8	9		

TABLE IX—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

IREDELL FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Berry's Big Boll-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	909.6	17	-----	-----
Layton's Improved-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	791.2	14	-----	-----
Gold Standard-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	787.2	16	-----	-----
Butler's Improved-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	894.6	8	-----	-----

TABLE X—SHOWING RELATIVE EARLINESS, VALUE, YIELD AND SIZE OF BOLLS, SEED AND STALKS OF VARIETIES OF COTTON TESTED IN 1905.

EDGEcombe FARM.

Percentage of Cotton Open at the Several Pickings.

Rank According to the Following Characters.

Varieties.	First Picking— October 2.	Second Picking— November 16.	Third Picking— January 20.	Earliness as Shown by Percentage Open at First Picking.	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed.	Height of Stalks.	Value of Total Pro- ducts (Lint and Seed).
Russell's Big Boll	45.2	45.5	9.3	19	3	1	21	3	1	1	---	3
Culpepper's Improved	49.9	42.2	7.9	16	2	2	13	11	3	9	---	2
Wilson's Matchless	53.7	39.0	7.3	11	15	9	16	8	---	---	---	16
Black Texas Wood	39.7	48.5	11.8	21	9	8	9	15	10	16	---	9
Peterkin's Improved	42.9	48.1	9.0	20	5	14	7	17	6	11	---	6
Shine's Extra Early Prolific	64.4	30.8	4.8	5	17	3	22	2	7	6	---	15
Jackson Limbless (Wilt Resistant)	45.5	43.6	10.9	18	10	21	2	22	14	---	---	12
Jackson Limbless (No. 128-1-29-1-11)	48.3	40.8	10.9	17	22	23	4	20	14	15	---	23
Moss' Improved	48.5	40.5	11.0	16	7	18	1	23	12	18	---	8
Dozier's Improved	86.5	11.0	2.5	1	20	22	11	13	12	---	---	20
Berry's Big Boll	66.0	29.4	4.6	3	23	12	23	1	4	2	---	22
Peterkin's Improved (Craig's)	64.5	31.6	3.9	4	18	17	12	12	15	17	---	18
Cook's Improved	63.9	31.5	4.6	6	4	10	8	16	4	3	---	5
Truitt's Improved	50.0	41.5	8.5	15	21	20	15	9	2	5	---	21
Layton's Improved	55.1	40.7	4.2	9	13	19	5	19	11	14	---	13
Gold Standard	51.2	43.1	5.7	14	14	11	10	14	8	12	---	14
Excelsior Prolific	54.3	40.9	4.8	10	1	13	3	21	8	8	---	1
Edgewood	53.2	40.1	6.7	12	11	6	18	6	5	4	---	10
Tool's Early Prolific	52.5	43.7	3.8	13	8	15	6	18	7	10	---	7
Webb	61.8	27.4	10.8	7	16	7	19	5	9	13	---	17
Braswell's Cluster	57.0	39.5	3.5	8	19	16	17	7	10	20	---	19
Butler's Early Prolific	51.7	43.7	4.6	14	12	5	20	4	8	19	---	11
Hodge	68.2	27.9	3.9	2	6	4	14	10	13	7	---	4

TABLE X—SHOWING RELATIVE EARLINESS, VALUE, YIELD AND SIZE OF BOLLS, SEED AND STALKS OF VARIETIES OF COTTON TESTED IN 1905—CONTINUED.

IREDELL FARM.

Varieties.	Percentage of Cotton Open at the Several Pickings.		Rank According to the Following Characters.									
	First Picking— October 12.	Second Picking— November 23.	Third Picking.	Earliness as Shown by Percentage Open at First Picking.	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed.	Height of Stalks.	Value of Total Pro- ducts (Lint and Seed).
Hodge-----	39.6	60.4	-----	4	2	1	19	4	11	11	12	2
Culpepper's Improved-----	21.7	73.3	-----	12	5	2	18	5	3	1	8	4
Wilson's Matchless-----	24.5	75.5	-----	9	6	4	16	7	6	12	6	6
Black Texas Wood-----	15.9	84.1	-----	16	15	14	11	12	17	21	7	15
Peterkin's Improved-----	16.7	83.3	-----	14	20	19	12	11	8	20	11	20
Shine's Extra Early Prolific-----	30.9	69.1	-----	8	8	6	17	6	13	6	5	7
Jackson Limbless (Wilt Resistant)---	7.1	92.9	-----	19	19	21	6	17	20	22	1	19
Jackson Limbless (No. 128-1-29-1-11)---	5.6	94.4	-----	21	23	23	10	13	9	13	1	23
Moss' Improved-----	6.6	93.4	-----	20	17	22	2	21	15	14	10	18
Dozier's Improved-----	59.8	40.2	-----	2	9	9	14	9	17	17	12	9
Berry's Big Boll-----	37.5	62.5	-----	5	18	3	22	1	2	3	3	17
Peterkin's Improved (Craig's)-----	23.5	76.5	-----	11	21	12	21	2	22	23	13	21
Cook's Improved-----	24.2	75.8	-----	10	3	8	8	15	4	4	4	3
Truitt's Improved-----	16.7	83.3	-----	14	22	15	20	3	1	2	8	22
Layton's Improved-----	16.2	83.8	-----	15	12	18	4	19	14	15	3	14
Gold Standard-----	14.4	85.6	-----	17	16	16	9	14	10	8	6	16
Excelsior Prolific-----	16.7	83.3	-----	14	11	17	3	20	12	16	8	10
Edgewood-----	21.3	78.7	-----	13	14	11	15	8	5	5	9	12
Tool's Early Prolific-----	11.9	88.1	-----	18	13	13	7	16	7	18	5	13
Webb-----	35.7	64.3	-----	6	4	5	14	9	16	10	3	5
King's Improved (Native)-----	60.6	39.4	-----	1	1	7	5	18	18	7	2	1
Butler's Early Prolific-----	31.4	68.6	-----	7	7	10	13	10	21	19	6	8
King's Improved-----	46.3	53.7	-----	3	10	20	1	22	19	9	8	11

TABLE XI—COMPILED RESULTS OF VARIETY TESTS OF COTTON, SHOWING RELATIVE EARLINESS, VALUE, YIELDS AND SIZE OF BOLLS, SEED AND STALKS.*

EDGECOMBE FARM.

Varieties.	Rank According to the Following Characters.									
	Number of Years Tested.	Earliness as Shown by Percentage of Bolls Open at First Picking.†	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed.‡	Height of Stalks.§	Value of Total Products (Lint and Seed).
Russell's Big Boll -----	3	5	5	1	5	1	1	1	3	4
Culpepper's Improved -----	3	2	3	3	3	3	2	3	4	5
Excelsior Prolific-----	3	3	1	4	2	4	5	5	2	1
Edgewood -----	3	1	2	2	4	2	3	2	4	2
Peterkin's Improved -----	3	4	4	5	1	5	4	4	1	3

RED SPRINGS FARM.

Russell's Big Boll -----	2	5	6	2	5	1	1	1	5	6
Edgewood -----	2	3	5	3	4	2	3	3	1	5
Culpepper's Improved (Red Springs) -----	2	2	2	1	3	3	2	2	2	2
Peterkin's Improved -----	2	6	3	5	2	4	4	5	4	3
King's Improved -----	2	1	4	6	1	5	6	6	6	4
Excelsior Prolific-----	2	4	1	4	2	4	5	4	3	1

IREDELL FARM.

King's Improved (Native) -----	3	1	1	1	4	3	5	3	5	1
King's Improved -----	3	2	2	3	1	6	6	4	6	2
Culpepper's Improved -----	3	4	3	2	6	1	1	1	3	3
Edgewood -----	3	5	4	4	5	2	2	2	4	4
Excelsior Prolific-----	3	3	5	5	3	4	4	5	1	5
Peterkin's Improved -----	3	6	6	6	2	5	3	6	2	6

* The comparisons of varieties in this table are the average of the results of the tests of 1903, 1904 and 1905.

† Results in this column for the Edgecombe Farm were obtained from data of 1904 and 1905 only.

‡ Results in this column for the Edgecombe Farm were obtained from data of 1903 only.

§ Results in this column for the Red Springs Farm were obtained from data of 1904 only.

COMMENTS ON VARIETY TESTS OF COTTON.

The varieties tested last year at each of the two Test Farms are arranged in Table VIII in the order of selling price of "total products," when lint is selling at 10 cents per pound and seed at 24 cents per bushel. This order may not be the order of productivity of seed cotton as is shown in the tests this year by *Russell's Big Boll* in comparison with *Culpepper's Improved* at Edgecombe, and *Tool's Early Prolific* with *Excelsior Prolific* at Iredell, and many other instances in the tests of this and previous years. The reason for some varieties, with smaller yields of seed cotton, producing more lint and hence greater selling price per acre than some others with a larger amount of seed cotton per acre, is due to the former varieties producing a high percentage of lint to seed.

The size of the plats used for these tests was about one-twentieth of an acre.

To eliminate inequalities in the land, if any, the different varieties at the separate farms were planted each in separate rows arranged consecutively, and this plan repeated a sufficient number of times to give the designated acreage. The rows were 3 1-3 feet apart at both farms, while the hills in the rows were 15 inches. It is absolutely essential, in order to eliminate soil and weather conditions as much as possible, to continue work of this kind for some years on different types of soils before attempting to draw definite conclusions. The yields for this year are presented in Table VIII, while the average rank of the several varieties tested during the past five years is shown in Table IX.

SOME NOTES ON VARIETIES OF COTTON TESTED IN 1905.

Russell's Big Boll is a hardy, large-bolled and vigorous-growing variety that yields well, especially on a loamy or sandy soil in the eastern part of the State, and is very popular with pickers. In value of total products (lint and seed) it stood third in 1900 and 1905, first in 1901 and 1902, seventh in 1903 and fourth in 1904 at the Edgecombe farm; third in 1900 and 1902, first in 1901, seventh in 1903 and fifth in 1904 at Red Springs; and third in 1903 and seventh in 1904 at Iredell. In ordinary seasons this variety is not only prolific but tolerably reliable, especially on the well-drained, sandy or loamy soil of the East.

Culpepper's Improved, too, is a large-bolled variety, yielding generally a little less per boll than *Russell's Big Boll*. It ranked* fourth in 1900, third in 1901, fifth in 1902, ninth in 1903, seventeenth in 1904 and second in 1905 at the Edgecombe farm; first in 1900, second in 1901, first in 1902, third from Red Springs seed and fourth from Edgecombe seed in 1903, second from Red Springs seed in 1904

*All ranks of varieties of cotton are based on value of total products (lint and seed) per acre.

at the Red Springs farm; and fifth, eighth and fourth in 1903, 1904 and 1905 respectively at Iredell. This variety is earlier by about ten days and seems to be more subject to variation than *Russell's Big Boll*, but, notwithstanding this last defect, is considered a good, reliable variety. Being a late-maturing variety and having a short growing season last year, especially at the Iredell farm, it was cut off some by frost. It has a large-sized weed with spreading limbs well-bolled, and holds its cotton well.

Peterkin's Improved is a very popular variety on account of its high-percentage yield of lint. It has a compact, bushy growth, with small bolls, which make it difficult and tedious to gather, and hence is very unpopular with pickers. About one-third of the seed are naked. In value it stood second in 1901, second in 1902, fourth in 1903, sixteenth in 1904 and sixth in 1905 at the Edgecombe farm; second in 1900, fourth in 1901, second in 1902, second in 1903 and tenth in 1904 at Red Springs; and eighth in 1903, twenty-first in 1904 and twentieth in 1905 at Iredell. This variety has tolerably high stalks with small, narrow leaves, and holds its bolls in clusters. It is hardy and holds its cotton well.

King's Improved has a boll a little smaller than *Peterkin's Improved*, but does not generally yield quite as high percentage of lint. It has a tolerably small stalk with spreading limbs. This and *Dozier's Improved* are two of the earliest-maturing varieties thus far tested. It occupied seventh place in 1902, and third in 1903 and 1904 at Edgecombe; fourth in 1902, sixth in 1903 and 1904 at Red Springs; and second in 1903, first in 1904 and eleventh in 1905 at Iredell, where the growing season is comparatively short.

Excelsior Prolific has large, deep-lobed leaves and short, well-matured limbs that bear very small bolls of high percentage of lint. It ranked second in 1903, seventh in 1904 and first in 1905 at Edgecombe; sixth in 1900, fifth in 1902, first in 1903 and third in 1904 at Red Springs; and sixth in 1903 and 1904 and tenth in 1905 at Iredell. This is a very promising variety for growth in the eastern part of the State.

Edgewood stood first in 1903 and tenth in 1904 and 1905 at Edgecombe; fifth in 1903 and ninth in 1904 at Red Springs; and fourth in 1903, eleventh in 1904, and twelfth in 1905 at Iredell. It has a tolerably heavy stalk, large leaves and short stems. It is, ordinarily, a rather late-maturing variety.

Moss' Improved stood first in 1900, sixth in 1901, seventeenth in 1904 and eighth in 1905 at Edgecombe; sixth in 1901 and seventeenth in 1904 at Red Springs; and nineteenth in 1904 and eighteenth in 1905 at Iredell. This variety possessed as high percentage of lint as any other variety tested this year.

Cook's Improved ranked second in 1904 and fifth in 1905 at the Edgecombe farm, and tenth in 1904 and third in 1905 at Iredell. It is a medium early-maturing variety.

Hodge ranked in 1904 and 1905 as fifth and fourth at Edgecombe, eighth at Red Springs in 1904 and fourth in 1904 and second in 1905 at Iredell. It is a rather early variety and has small bolls and seed.

Webb occupied eighth and seventeenth place at Edgecombe in 1904 and 1905, seventh at Red Springs in 1904, and third and fifth in 1904 and 1905 at Iredell. Has rather small bolls and seed.

Tool's Early Prolific stood ninth in 1904 and seventh in 1905 at Edgecombe, fourth at Red Springs in 1904, and seventeenth in 1904 and thirteenth in 1905 at Iredell. Rather late-maturing variety.

Shine's Extra Early Prolific ranked eleventh in 1904 and fifteenth in 1905 at Edgecombe; twelfth at Red Springs in 1904, and fifth in 1904 and seventh in 1905 at Iredell. Our tests of two years indicate this to be a rather early-maturing variety.

Black Texas Wood ranked fifteenth in 1904 and ninth in 1905 at Edgecombe, thirteenth at Red Springs in 1904, and twentieth in 1904 and fifteenth in 1905 at Iredell. This is a late-maturing variety.

Jackson Limbless ranked at the Iredell farm as twenty-third and nineteenth in 1904 and 1905 in comparison with twenty-four other varieties. It had high stalks, large seed and bolls and was rather late in maturing.

Jackson Limbless (No. 128-1-29-1-11) ranked in twenty-third place at both the Edgecombe and Iredell farms.

King's Improved (native) stood first in 1903, second in 1904, and first in 1905 at the Iredell farm. This has thus far given the best average yield per acre at this farm of all varieties tested.

Wilson's Matchless ranked in this year's tests in sixteenth place at Edgecombe and sixth at Iredell.

Butler's Early Prolific occupied eleventh place at Edgecombe and eighth at Iredell in this year's tests.

Dozier's Improved ranked twentieth at Edgecombe and ninth at Iredell. Very early-maturing variety.

Layton's Improved stood thirteenth and fourteenth at Edgecombe and Iredell respectively.

Gold Standard ranked fourteenth at Edgecombe and sixteenth at Iredell.

Berry's Big Boll occupied twenty-second and seventeenth places respectively at Edgecombe and Iredell.

Craig's Peterkin's Improved ranked eighteenth at Edgecombe and twenty-first at Iredell. Does not seem to yield as well as original *Peterkin Improved*.

Truitt's Improved ranked third in 1902, eighth in 1903 and twenty-first in 1905 at Edgecombe; eighth in 1903 at Red Springs, and ninth in 1903 and twenty-second in 1905 at Iredell.

CORRELATION OF CHARACTERS OF VARIETIES OF COTTON.

With cotton, as with corn, it is of the highest importance for farmers and imperative for all those who are studying or trying to improve varieties, to know what characters are usually antagonistic and what ones are mutually helpful in their economic development. In Table XI are compiled, in concise form, the results of three years' tests at Edgecombe and Iredell farms and two years at Red Springs. From this compilation, supplemented by observation in the field and at the gin, the following tentative inferences are made in reference to the varieties of upland cotton tested, when grown under the conditions of climate and soil as represented by these three farms:

Antagonistic Characters.—(1) Earliness in maturity is not usually conducive to large yields, although in areas where a short-growing period is afforded the earlier maturing varieties often give the greater yields (but these are not large generally) as is shown by *King's Improved*, which, during the past three years, has proven the most prolific of seed cotton at the Iredell farm where the growing period for cotton during an average season is comparatively short. (2) Varieties that have large seed generally yield a small percentage of lint to seed. (3) Late-maturing varieties do not generally produce seed cotton that yields a high percentage of lint, although the number of pounds of lint per acre may be large. (4) Small-bolled varieties are not generally easily picked and hence are unpopular with pickers.

Associated Characters.—(1) Varieties that mature early tend to the production of seed cotton that contains a high percentage of lint to seed. (2) Varieties with short staple usually have a high percentage of lint and *vice versa*. (3) Varieties with large bolls generally have large seed and small percentage of lint. (4) The larger the yield of seed cotton per acre, through proper fertilization or favorable seasonal conditions, the lower the percentage of lint to seed, even of the same variety. (5) Good root and leaf development of a variety tend to increase power of resistance to drought, insect and disease ravages.

SELECTING SEED FOR IMPROVEMENT.

With cotton it is of the highest importance that seed for planting purposes be selected from plants in the field, having especial reference to total yield of seed cotton, percentage yield of lint, date of maturity, vigor, hardiness, form and size of bolls, leaves, stalks, limbs, etc., because here also, as with animals, like has a decidedly strong tendency to produce or beget like. Above all things, the practice of

selecting seed at random at the gin should not be followed, for it cannot possibly be known whether the seed secured in this manner were produced on stalks that bore few or many bolls. If seed of the former kind are obtained, then the tendency of these seeds when planted will be to produce a small yield, and *vice versa*. Again, in securing seed from the gin it is generally deferred until late in the season, and usually seed from the last picking are obtained, which are the poorest seed. It is generally conceded by the best cotton-growers that the best seed are from the middle picking.

In selecting a variety of cotton one must not be guided entirely by total yield of seed cotton, as often between two varieties producing about the same yield the one with the smaller yield should be chosen because of its greater production of lint, which sells for from eight to fifteen times as much per pound as seed.

SOURCES OF VARIETIES OF COTTON TESTED.

The seed used in the variety test of cotton at the three farms this year were obtained from the following sources:

Berry's Big Boll.....	W. R. Craig, Waxhaw, N. C.
Black Texas Wood.....	Martin McKinnon, Red Springs, N. C.
Braswell's Cluster.....	J. R. Pitt, Rocky Mount, N. C.
Butler's Early Prolific.....	J. M. Butler, St. Pauls, N. C.
Cook's Improved.....	J. R. Cook, Schley, Ga.
Culpepper's Improved.....	Red Springs Test Farm, Red Springs, N. C.
Dozier's Improved.....	W. D. Dozier, Camden, N. C.
Edgewood.....	J. C. Little, Louisville, Ga.
Excelsior Prolific.....	Excelsior Seed Farm, Bennettsville, S. C.
Gold Standard.....	Excelsior Seed Farm, Bennettsville, S. C.
Hodge.....	C. N. Allen, Auburn, N. C.
Jackson Limbless, Wilt-Resistant, Bureau Plant Industry, Washington, D. C.	
Jackson Limbless, Wilt-Resistant (No. 128-1-29-1-11),	Bureau of Plant Industry, Washington, D. C.
King's Improved.....	Iredell Test Farm, Statesville, N. C.
King's Improved (Native).....	J. W. Sherrill, Statesville, N. C.
Layton's Improved.....	R. D. Layton, St. Matthews, S. C.
Moss' Improved.....	B. D. Moss, Norway, S. C.
Peterkin's Improved.....	J. A. Peterkin, Fort Motte, S. C.
Peterkin's Improved (Craig).....	W. R. Craig, Waxhaw, N. C.
Russell's Big Boll.....	Edgecombe Test Farm, Rocky Mount, N. C.
Shine's Early Prolific.....	J. A. Shine, Faison, N. C.
Tool's Early Prolific.....	Alexander Seed Co., Augusta, Ga.
Truitt's Improved.....	George W. Truitt, LaGrange, Ga.
Webb.....	Dr. C. L. Killebrew, Rocky Mount, N. C.
Wilson's Matchless.....	F. D. Wilson, Littleton, N. C.

RESULTS OF DISTANCE TESTS OF COTTON.

These results are found in Tables XII and XIII, which follow:

TABLE XII—RESULTS OF

EDGECOMBE

Size of Plats in Parts of Acre.	Distance Between Rows.	Distance Between Stalks in Rows.	Number Stalks per Plat.		Average Height of Stalks in Inches at Maturity.
			For Perfect Stand.	By Actual Count.	
.0698	Three and one-third feet -----	Twelve inches -----	912	712	-----
.0698	Three and one-third feet -----	Sixteen inches -----	684	665	-----
.0698	Three and one-third feet -----	Twenty inches -----	548	713	-----
.0698	Three and one-third feet -----	Twenty-four inches -----	456	585	-----
.0837	Four feet -----	Twelve inches -----	911	566	-----
.0837	Four feet -----	Sixteen inches -----	683	482	-----
.0837	Four feet -----	Twenty inches -----	547	483	-----
.0837	Four feet -----	Twenty-four inches -----	455	559	-----

IREDELL.

.0500	Three and one-third feet -----	Twelve inches -----	653	601	30
.0500	Three and one-third feet -----	Sixteen inches -----	490	474	32
.0500	Three and one-third feet -----	Twenty inches -----	392	385	32
.0500	Three and one-third feet -----	Twenty-four inches -----	327	342	34
.0600	Four feet -----	Twelve inches -----	544	588	34
.0600	Four feet -----	Sixteen inches -----	408	481	34
.0600	Four feet -----	Twenty inches -----	326	390	34
.0600	Four feet -----	Twenty-four inches -----	272	300	35

* Russell's Big Boll was used in this test at the Edgecombe Farm and its percentage of lint to

DISTANCE TESTS OF COTTON.

FARM.

Yield of Seed Cotton in Pounds per Plat at the Several Pickings.				Yield of Seed Cotton per Acre.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 10 Cents per Pound.	Value of Seed per Acre at 80 Cents per Hundred Pounds or 24 Cents per Bushel.	Total Value of Lint and Seed per Acre.
First Picking— October 2.	Second Picking— November 9.	Third Picking— January 22.	Total Pickings.						
38.00	49.25	24.00	111.25	1593.84	518.95	1074.89	\$ 51.90	\$ 8.60	\$ 60.50
29.00	49.25	23.50	101.75	1457.74	474.64	983.10	47.46	7.86	55.32
24.00	41.00	19.75	84.75	1214.18	395.34	818.84	39.53	6.55	46.08
37.00	54.50	26.00	117.50	1683.38	548.11	1135.27	54.81	9.08	63.89
55.50	70.00	33.25	158.75	1896.65	617.55	1279.10	61.76	10.23	71.99
45.50	82.00	41.50	169.00	2019.12	657.43	1361.69	65.74	10.89	76.63
32.50	58.00	41.50	132.00	1577.06	513.49	1063.57	51.35	8.51	59.86
30.00	52.50	42.75	125.25	1493.43	486.26	1007.17	48.63	8.06	56.69

FARM.

Sept. 24	Oct. 25	Nov. 27							
24.25	22.00	2.50	48.75	975.00	404.14	570.86	\$ 40.41	\$ 4.57	\$ 44.98
24.00	28.50	2.50	55.00	1100.00	455.95	644.05	45.60	5.15	50.75
24.75	24.00	3.00	51.75	1035.00	429.00	606.00	42.90	4.85	47.75
22.50	28.00	5.00	55.50	1110.00	460.10	649.90	46.01	5.20	51.21
27.00	34.75	5.25	67.00	1340.00	555.43	784.57	55.54	6.28	61.82
25.50	33.50	5.00	64.00	1280.00	530.56	749.44	53.06	6.00	59.06
18.50	32.50	7.50	58.50	1170.00	484.97	685.03	48.50	5.48	53.98
16.75	31.50	18.00	66.25	1325.00	549.21	775.79	54.92	6.21	61.13

seed was taken at 32.56 per cent, which is the average of four years' results at this farm.

TABLE XIII—COMPILED RESULTS OF DISTANCE TESTS OF COTTON.

EDGECOMBE FARM.

Yield Seed Cotton in Pounds per Acre at Different Distancing.

Year.	3½ Feet by 12 Inches.*	3½ Feet by 16 Inches.*	3½ Feet by 20 Inches.*	3½ Feet by 24 Inches.*	4 Feet by 12 Inches.	4 Feet by 15 Inches.	4 Feet by 16 Inches.	4 Feet by 20 Inches.	4 Feet by 24 Inches.
1901	1286.0	1384.0	1410.0	1063.0	964.0			893.0	
1903	1507.1	1507.1	1342.9	1342.9	1506.3		1331.1	1306.3	1312.5
1904	1541.2	1751.9	1632.4	1746.0	1723.3		1828.9	1646.6	1861.1
1905	1593.8	1457.7	1214.2	1683.4	1896.7		2019.1	1577.1	1493.4
Averages	1482.0	1525.1	1399.9	1458.8	1522.6			1355.8	

RED SPRINGS FARM.

1901	284.0	288.0	359.0	447.8	566.9		634.7		
1902	1258.6	1310.3	1340.5	1428.9	1229.3		1153.2	1051.4	1165.8
1903	831.8	897.2	906.5	757.0	883.1		997.6	842.2	727.7
1904	857.5	750.0	675.0	860.0	767.5		815.0	727.5	622.5
Averages	808.0	811.4	820.3	873.4	861.7		900.1		

IREDELL FARM.

1903	743.2	743.2	630.6	750.8	612.5	700.0	675.0	862.5	791.7
1904	845.0	795.0	810.0	835.0	845.8		812.5	779.2	762.5
1905	975.0	1100.0	1035.0	1110.0	1340.0		1280.0	1170.0	1325.0
Averages	854.4	879.4	825.2	898.6	932.8		922.5	937.2	959.7

* The rows at the Iredell farm in 1903, 1904 and 1905, at the Red Springs farm in 1904 and at Edgcombe farm in 1905 were 3½ feet apart instead of 3¼ feet as indicated.

COMMENTS ON DISTANCE TEST OF COTTON.

The average results of the distance tests conducted at the Edgecombe and Red Springs farms during the past four years indicate that the best distancing of cotton for the Edgecombe section is somewhere about $3\frac{1}{2}$ feet by 16 inches, while at Red Springs it centers closely around 4 feet by 16 inches. As the average of three years' tests at the Iredell farm the best distancing was 4 feet by 24 inches.

The general deductions above should be accepted tentatively, as here, as with other tests, it will require a number of repetitions to arrive at a fair idea of the best width of rows and distance in rows for planting cotton on the types of soils on which these tests were made.

The plats at the three farms were arranged in lateral series, with each test occupying from two to six rows.

As the results of this test are likely to vary somewhat with different varieties, *Culpepper's Improved* seed were used at Red Springs, *Russell's Big Boll* at Edgecombe, and *King's Improved** at Iredell.

In Table XIII is presented a summary of four years' tests at Edgecombe and at Red Springs, and three at Iredell.

III. FERTILIZATION AND CULTIVATION OF CORN AND COTTON.

CORN.

Culture.—It unquestionably pays well to thoroughly break and broadcast-harrow land for corn. Using a two-horse plow and running it 8 to 10 inches deep, and afterwards harrowing with large smoothing harrow, puts the land in nice condition. It is also well to run a small-tooth harrow or weeder across corn rows about the time the plants are coming up, and even after they are several inches high, slanting the teeth of the harrow backward. Harrowing in this way saves after-cultivation, and is a quick and comparatively inexpensive way of getting over the land. The land being thoroughly broken before the corn is put in the ground, only shallow, level cultivation with some one of the considerable number of good cultivators need be given the crop during the growing season. The one-horse cultivators cover corn rows in two or three furrows, and the two-horse ones at a single trip. The cultivations should be frequent—about every ten to twelve days—and if possible just after rains, so as to break any crust formed by showers, leaving a dust mulch to retard the loss of moisture added to the soil by previous rains. Toward the end of the growing season the cultivators should only be run one to one and a half inches deep, so as to disturb as little as possible the roots of the plants, which, by that time, are well into the middle of the rows.

Fertilizers for Corn.—The experimental work on the sandy soils of the east, reports of which have been made previously, has pro-

* *Culpepper Improved* was used in the test of 1903.

gressed far enough, we feel, to draw some conclusions in reference to the best amounts and proportions of nitrogen, phosphoric acid and potash for corn. As the results of the past four years' work have not yet been published, the following formulas, based on the results of the first two years' tests and tests in other States with similar soil and climatic conditions, are given as good ones for corn:

For Corn on Land in Fair Condition.

No. 1—

Acid phosphate, 14 per cent phosphoric acid.....	900 pounds
Cotton-seed meal, 6.59* per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	960 pounds
Kainit, 12.5 per cent potash.....	140 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.5 per cent; potash, 1.6 per cent; nitrogen, 3.2 per cent (equal to ammonia, 3.9 per cent).

No. 2—

Acid phosphate, 14 per cent phosphoric acid.....	1,045 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	520 pounds
Nitrate of soda, 15 per cent nitrogen.....	225 pounds
Kainit, 12.5 per cent potash.....	210 pounds
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	2,000 pounds

In this formula one-half of the nitrogen is supplied by nitrate of soda and the other one-half by cotton-seed meal. This mixture will contain: available phosphoric acid, 8.0 per cent; potash, 1.7 per cent; nitrogen, 3.4 per cent (equal to ammonia, 4.0 per cent).

No. 3—

Acid phosphate, 14 per cent phosphoric acid.....	965 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	750 pounds
Nitrate of soda, 15 per cent nitrogen.....	110 pounds
Kainit, 12.5 per cent potash.....	175 pounds
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	2,000 pounds

In this formula one-fourth of the nitrogen is supplied by nitrate of soda and the other three-fourths by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.7 per cent; potash, 1.7 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 4—

Acid phosphate, 16 per cent phosphoric acid.....	835 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,010 pounds
Kainit, 12.5 per cent potash.....	155 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.9 per cent; potash, 1.7 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

* 6.59 per cent nitrogen equals 8 per cent ammonia.

No. 5—

Acid phosphate, 14 per cent phosphoric acid.....	860 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	850 pounds
Kainit, 12.5 per cent potash.....	290 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 8.6 per cent; potash, 1.8 per cent; nitrogen, 3.5 per cent (equal to ammonia, 4.3 per cent).

No. 6—

Acid phosphate, 16 per cent phosphoric acid.....	800 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	900 pounds
Kainit, 12.5 per cent potash.....	300 pounds
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	2,000 pounds

This mixture is more concentrated than preceding ones on account of the use of higher grade materials and will contain: available phosphoric acid, 9.1 per cent; potash, 1.9 per cent; nitrogen, 3.7 per cent (equal to ammonia, 4.5 per cent).

No. 7—

Acid phosphate, 14 per cent phosphoric acid.....	960 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	960 pounds
Muriate of potash, 50 per cent potash.....	80 pounds
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	2,000 pounds

This mixture, too, is more concentrated than the preceding ones on account of the use of a high-grade potassic material, muriate of potash, and will contain: available phosphoric acid, 9.6 per cent; potash, 2.0 per cent; nitrogen, 4.0 per cent (equal to ammonia, 4.8 per cent).

No. 8—

Acid phosphate, 14 per cent phosphoric acid.....	950 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,015 pounds
Muriate of potash, 50 per cent potash.....	35 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.9 per cent; potash, 1.6 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 9—

Acid phosphate, 16 per cent phosphoric acid.....	900 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,060 pounds
Muriate of potash, 50 per cent potash.....	40 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 8.5 per cent; potash, 1.8 per cent; nitrogen, 3.5 per cent (equal to ammonia, 4.3 per cent).

No. 10—

Acid phosphate, 14 per cent phosphoric acid.....	1,365 pounds
Dried blood, 13 per cent nitrogen.....	555 pounds
Muriate of potash, 50 per cent potash.....	80 pounds
	<hr/> 2,000 pounds

This mixture is a concentrated one on account of high-grade nitrogenous and potassic materials being used, and will contain: available phosphoric acid, 9.6 per cent; potash, 2.0 per cent; nitrogen, 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 11—

Acid phosphate, 16 per cent phosphoric acid.....	1,310 pounds
Dried blood, 13 per cent nitrogen.....	600 pounds
Muriate of potash, 50 per cent potash.....	90 pounds
	<hr/> 2,000 pounds

This mixture is quite concentrated on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 10.5 per cent; potash, 2.3 per cent; nitrogen, 3.9 per cent (equal to ammonia, 4.7 per cent).

No. 12—

Bone meal, 22.5 per cent phosphoric acid and 3.7 per cent nitrogen	950 pounds
Cotton-seed meal, 6.59 per cent nitrogen and 2.5 per cent phosphoric acid and 1.5 per cent potash.....	975 pounds
Muriate of potash, 50 per cent potash.....	75 pounds
	<hr/> 2,000 pounds

This mixture is a concentrated one on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 11.9 per cent; potash, 2.6 per cent; nitrogen, 5.0 per cent (equal to ammonia, 6.0 per cent).

No. 13—

Acid phosphate, 14 per cent phosphoric acid.....	585 pounds
Cotton-seed meal, 3.1 per cent nitrogen, 1.3 per cent phosphoric acid and 1.2 per cent potash.....	1,375 pounds
Kainit, 12.5 per cent potash.....	40 pounds
	<hr/> 2,000 pounds

This mixture will contain: available phosphoric acid, 5.0 per cent; potash, 1.1 per cent; nitrogen, 2.1 per cent (equal to ammonia, 2.6 per cent).

Cotton Seed.—Cotton seed may replace the meal in preceding formulas containing meal by allowing 2 pounds of seed for one of meal.

Nitrate of Soda.—This material is quick-acting because of its easy solubility in water. For this reason, when used in a considerable quantity in fertilizers at time of planting, especially on light sandy land, there is considerable danger of its being leached beyond the reach of the roots of the plants before they can use it. On clay lands and loams having good subsoils, to them this danger does not exist,

certainly not to the extent that it does on light soils. A small amount of nitrate of soda in the mixture will give the crop a quick start and make its cultivation easier and more economical. Formula No. 3 has been arranged with this idea in view, and in No. 2 one-half the nitrogen comes from nitrate of soda. On light lands it would likely be better to omit the nitrate from the mixture and apply it as a top dressing between the tenth and last of June on early corn. Nitrate of soda may take the place of a portion of the other nitrogen-furnishing materials in any of the formulas, one pound of nitrate being equal in its content of nitrogen to 2.2 pounds of cotton-seed meal, 2 pounds of fish scrap, 1.2 pounds of dried blood. Nitrate of soda is frequently used as a top dressing for corn and is a very valuable material for use in this way. A good application is 50 to 75 pounds per acre, distributed along the side of the row or dropped beside the plants and three or four inches from them, or else where there is a ridge in the center it may be distributed on this, and when it is thrown out the nitrate will be thrown to the two sides of the row.

Application of Fertilizers to Corn.—On clay lands and loams having good subsoil the fertilizer should be applied in the drill, at or just before planting, at the rate of 200 to 400 pounds per acre. On light sandy lands it is best to use 50 to 100 pounds in the drill at time of planting, to give the crop a good start, and the balance of the fertilizer as a side-dressing when the corn has begun to grow well.

Fertilizers for Corn Following Peas and Other Legumes.

The best and most profitable yields of corn in our experimental work were where the corn followed velvet beans, bur clover, cow-peas and crimson clover and other leguminous crops. These crops, with acid phosphate and kainit, or some other potash salt, are the best previous treatment and fertilization for corn. Where light crops of peas have been grown in corn, or cut from the land and the stubble left, it would be safest to add some nitrogenous material in the fertilizer mixture. In cases of this kind it is suggested that the nitrogen-furnishing material in any of the preceding formulas be reduced one-half. Where corn is to follow good crops of velvet beans, peas, bur and crimson clover or soja beans, especially where the entire crops have been left on the soil, no further application of nitrogen need be made, but it is advised that 200 to 300 pounds per acre of the following mixture, in the drill, be used just before planting:

Acid phosphate	200 pounds
Kainit	100 pounds

COTTON.

Culture.—The remarks regarding the preparation and cultivation of corn also apply with equal force to cotton, unless it be the part regarding breaking the land well before planting. Some doubt the

necessity of this for cotton. Cotton is generally grown on ridges. This is necessary on wet soils, but on all fairly well-drained upland and sandy soils we are convinced that level and frequent shallow cultivation, as was indicated for corn, is the best and most economical method to follow in growing cotton. Ridge culture may give better results in very wet years, but, taking the seasons as they come, the advantage will lie, we think, with flat culture.

Fertilizers for Cotton.—The preliminary remarks regarding fertilizers for corn also apply to cotton, the following formulas being offered tentatively and as the result of our best judgment, after studying the best obtainable data on the subject:

No. 1— *For Cotton on Land in Fair Condition.*

Acid phosphate, 14 per cent phosphoric acid.....	895 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	790 pounds
Kainit, 12.5 per cent potash.....	315 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 2.6 per cent; nitrogen, 2.6 per cent (equal to ammonia, 3.2 per cent).

No. 2—

Acid phosphate, 14 per cent phosphoric acid.....	1,015 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	415 pounds
Nitrate of soda, 15 per cent nitrogen.....	180 pounds
Kainit, 12.5 per cent potash.....	390 pounds
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	2,000 pounds

In this formula one-half of the nitrogen is supplied by nitrate of soda and the other one-half by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.6 per cent; potash, 2.7 per cent; nitrogen, 2.7 per cent (equal to ammonia, 3.3 per cent).

No. 3—

Acid phosphate, 14 per cent phosphoric acid.....	955 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	605 pounds
Nitrate of soda, 15 per cent nitrogen.....	90 pounds
Kainit, 12.5 per cent potash.....	350 pounds
	<hr/>
	2,000 pounds

In this formula one-fourth of the nitrogen is supplied by nitrate of soda and the other three-fourths by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.4 per cent; potash, 2.6 per cent; nitrogen, 2.6 per cent (equal to ammonia, 3.1 per cent).

No. 4—

Acid phosphate, 16 per cent phosphoric acid.....	830 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	830 pounds
Kainit, 12.5 per cent potash.....	340 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.7 per cent; potash, 2.7 per cent; nitrogen, 2.7 per cent (equal to ammonia, 3.3 per cent).

No. 5—

Acid phosphate, 14 per cent phosphoric acid.....	850 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	690 pounds
Kainit, 12.5 per cent potash.....	460 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 8.0 per cent; potash, 2.9 per cent; nitrogen, 2.9 per cent (equal to ammonia, 3.5 per cent).

No. 6—

Acid phosphate, 16 per cent phosphoric acid.....	790 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	730 pounds
Kainit, 12.5 per cent potash.....	480 pounds
	<hr/>
	2,000 pounds

This mixture is more concentrated than the foregoing ones on account of the higher-grade materials used, and will contain: available phosphoric acid, 8.5 per cent; potash, 3.0 per cent; nitrogen, 3.0 per cent (equal to ammonia, 3.6 per cent).

No. 7—

Acid phosphate, 14 per cent phosphoric acid.....	1,020 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	890 pounds
Muriate of potash, 50 per cent potash.....	90 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 8.3 per cent; potash, 2.9 per cent; nitrogen, 2.9 per cent (equal to ammonia, 3.5 per cent).

No. 8—

Acid phosphate, 16 per cent phosphoric acid.....	965 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	940 pounds
Muriate of potash, 50 per cent potash.....	95 pounds
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	2,000 pounds

This mixture is a concentrated one on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 8.9 per cent; potash, 3.1 per cent; nitrogen, 3.1 per cent (equal to ammonia, 3.8 per cent).

No. 9—

Acid phosphate, 14 per cent phosphoric acid.....	1,045 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	820 pounds
Muriate of potash, 50 per cent potash.....	135 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 9.8 per cent; potash, 3.4 per cent; nitrogen, 3.4 per cent (equal to ammonia, 4.1 per cent).

No. 10—

Acid phosphate, 16 per cent phosphoric acid.....	975 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	880 pounds
Muriate of potash, 50 per cent potash.....	145 pounds
	<hr/>
	2,000 pounds

This mixture is considerably more concentrated than the others on account of the high-grade materials used, and will contain: available phosphoric acid, 10.4 per cent; potash, 3.6 per cent; nitrogen, 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 11—

Acid phosphate, 14 per cent phosphoric acid.....	1,355 pounds
Dried blood, 13 per cent nitrogen.....	510 pounds
Muriate of potash, 50 per cent potash.....	135 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 9.5 per cent; potash, 3.4 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 12—

Acid phosphate, 16 per cent phosphoric acid.....	1,295 pounds
Dried blood, 13 per cent nitrogen.....	560 pounds
Muriate of potash, 50 per cent potash.....	145 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 10.4 per cent; potash, 3.6 per cent; nitrogen, 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 13—

Acid phosphate, 14 per cent phosphoric acid.....	630 pounds
Cotton seed, 3.1 per cent nitrogen, 1.3 per cent phosphoric acid and 1.2 per cent potash.....	1,190 pounds
Kainit, 12.5 per cent potash.....	180 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 5.2 per cent; potash, 1.8 per cent; nitrogen, 1.8 per cent (equal to ammonia, 2.2 per cent).

Cotton Seed and Nitrate of Soda.—The remarks under corn regarding these two fertilizing materials apply also to cotton, as do the suggestions concerning the change in the quantity of nitrogen-supplying materials in the formulas, should cotton follow peas or any other leguminous crop. In Formula No. 3 one-fourth of the nitrogen is supplied by nitrate of soda, with the view of giving the crop a quick start, and in No. 2 one-half of the nitrogen comes from this source. On light lands it will be good practice to omit this nitrate from the

mixture and apply it as a side-dressing about the middle of June. Good results come from the use of it in this way on heavy types of land. Where land does not produce a good stalk of cotton and fertilizers are used which contain only a moderate amount of nitrogen or ammonia, good results are obtained from a side-dressing of 50 to 100 pounds of nitrate of soda per acre. The nitrate should be distributed along one side of the row, or where there is a ridge in the middle it may be put on this, and when the ridge is thrown out the nitrate will be thrown on two sides of the row.

Application of Fertilizer to Cotton.—The fertilizer should be applied in the drill at or just before planting. The quantity used for cotton varies from 200 to 1,000 pounds per acre; 400 to 600 pounds are the more common quantities used of the grade of Formula No. 1. Some of the mixtures in this Bulletin are much more concentrated than No. 1, and when they are used the quantity may be reduced proportionately.

IV. COMPOSTS AND COMPOSTING.

Compost for General Use.—Frequent requests are made for compost formulas, and the following one, with barn-yard manure, rich dirt, or woods-mould, or all, and acid phosphate and kainit, is well suited for general use:

Barn-yard manure, rich dirt or woods-mould.....	1,750 pounds
Acid phosphate	200 pounds
Kainit	50 pounds
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	2,000 pounds

With average barn-yard manure the above compost would contain: phosphoric acid, 1.7 per cent; potash, .7 per cent, and ammonia, .6 per cent. One ton of this compost is worth between 500 and 600 pounds of the average fertilizer containing 8 per cent of available phosphoric acid, 2 per cent of potash, and 2 per cent of ammonia. It should be applied at the rate of 600 to 1,600 pounds per acre in the drill, 1,400 pounds of the compost being about equal to an application of 400 pounds of the 8-2-2 fertilizer.

The compost may be made under shelter or out of doors. In either case select a place where the soil is compact and arrange it so that the water that may run through the heap will not drain from it. Put down the materials in alternate layers: first, a layer 3 to 6 inches thick, according to the size of the compost to be made, of the manure, woods-mould or rich dirt, then sprinkle upon this layers of acid phosphate and kainit, and continue in this way to put down alternate layers of the materials till the compost is complete. If dry, the manure, mould, etc., should be moistened by sprinkling with water, and the heap should be brought to a conical or wedge shape, covered with dirt, preferably rich dirt, and thoroughly compacted to prevent undue entrance of air, which brings about heating and injurious fer-

mentation of the heap. The compost must be watched, and if it becomes hot, a hole should be made in the side and towards the top and water poured in to cool it. Heating is likely to occur if made under shelter, while if made out of doors in the winter and early spring the rains are apt to be sufficient to keep it moist, but here there is danger of loss, especially of the very soluble potash and phosphoric acid, from leaching, and the heaps made out of doors need careful watching to see that they do not get too hot just after making and between rains, and more especially to see that they are thoroughly covered with dirt and compacted, so as to make the water run mostly off the sides instead of through the heap and draining off with the most valuable part of the manure. The heap should remain 40 to 60 days, and may stay longer. Before using, it should be thoroughly cut up and mixed by means of hoes and shovels. If the manure, woods-mould and dirt are reasonably free from litter and trash, the mixture may be put through a sand-screen and be in condition to drill as other fertilizers are. This will require care in selecting the manure, mould and dirt.

Unquestionably there is great advantage, if it is not indeed an absolute necessity, to save scrupulously all the manure and other waste material on and around the farm to assist in maintaining or increasing its productiveness. One way to do this is to use the compost in some way similar to that suggested in the foregoing. Another and perhaps somewhat cheaper way, unless the compost is made at a time when the farm labor is not profitably occupied with other work, is to apply the manure and woods-mould, etc., broadcast where there are large quantities of them, or in the drill when the amounts are limited and less than 1,500 to 2,000 pounds to the acre, and drill the acid phosphate and kainit or other materials on them. This saves the cost of mixing. Each plan has its advantages and each farmer can decide for himself which best suits his individual case and which will enable him to save to best advantage these exceedingly important and valuable fertilizer materials on and about the farm, and which go to waste, or partial waste, in far too many instances.

Compost with Cotton Seed.—Frequently cotton seed are used as a fertilizer. One difficulty in the way of their use is the killing of the germs of the seed so as to prevent them from sprouting and growing. A common custom is to pile the seed in the field early in the spring and allow them to become wet and afterwards heat. They are then put in the drill as other fertilizers, or sometimes broadcast. They are also killed by composting, and the following compost with cotton seed is a well-balanced and rich one for general farm crops:

Acid phosphate	300 pounds
Cotton seed, 13½ bushels.....	400 pounds
Kainit	75 pounds
Barn-yard manure, etc.....	1.225 pounds
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	2,000 pounds

This compost will contain: phosphoric acid, 2.6 per cent; potash, .9 per cent; ammonia, 1.1 per cent. One ton of it is worth between 800 and 900 pounds of the average fertilizer containing 8 per cent available phosphoric acid, 2 per cent ammonia and 2 per cent potash, and a good application for cotton would be 600 to 1,200 pounds in the drill, and for corn 400 to 800 pounds in the drill.

Compost with Cotton-seed Meal.—Cotton-seed meal may replace the seed in the preceding compost. In fact, it is much better to use some of the insoluble forms of nitrogen or ammonia in composts rather than nitrate of soda or sulphate of ammonia, which are already in easily soluble condition and ready to feed plants. Besides, there is not the same danger of loss when materials like cotton seed, cotton-seed meal, etc., are used as when nitrate of soda and sulphate of ammonia are employed. The following compost with cotton-seed meal is some richer than the one with seed given above:

Acid phosphate	325 pounds
Cotton-seed meal	200 pounds
Kainit	100 pounds
Barn-yard manure, etc.....	1,375 pounds
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	2,000 pounds

This mixture will contain: phosphoric acid, 2.8 per cent; potash, 1.0 per cent; ammonia, 1.2 per cent. One ton of this is equal in fertilizing value to about one-half ton of a mixed fertilizer containing 8 per cent available phosphoric acid, 2 per cent ammonia and 2 per cent potash. A good application of it for cotton would be 400 to 800 pounds in the drill, and for corn 300 to 600 pounds in the drill.

Use Lime in the Compost.—Where lime is used at all in the making of compost, it should not be put in contact with either the barn-yard manure or acid phosphate, as it has an injurious action on both of these, endangering the loss of ammonia from the manure by setting it free and enabling it to pass off in the air, and changing the phosphoric acid of the acid phosphate into an insoluble form. Where sour muck or black soil is used the lime mixed with these would correct their acidity or sourness and prove beneficial.

V. FERTILIZERS FOR TOBACCO.

There are few products whose quality and quantity are more affected by the kind of soil and fertilizer used than is tobacco. For bright tobacco, the main kind grown in this State, the fine and deep sandy loam with yellow-colored sandy clay subsoil is the type of land most largely used and the one which grows the best grade of this character of tobacco. Generally, the kind of soil that is suited to the production of tobacco is better understood than the fertilizer that should be used on it. Evidence of this is seen in the great variation in the composition of fertilizers sold in the State, especially for use on the tobacco crop. In 1901 there were registered with the Depart-

ment of Agriculture one hundred and eight (108) special fertilizers for tobacco. It is interesting in this connection to note the wide variation as well as the average composition of these fertilizers. The highest amount of available phosphoric acid guaranteed in any of them was 9.25 per cent; the lowest 5 per cent, and the average 8.12 per cent. The highest amount of ammonia guaranteed was 10 per cent, the lowest 2 per cent, and the average 2.73 per cent. The highest amount of potash guaranteed was 5 per cent, the lowest 1 per cent, and the average 2.64 per cent. These wide variations in the amounts of the valuable fertilizing constituents indicate that the fertilizers themselves must have had very varying effects on the quality and quantity of the tobacco crop.

A study of the experiments in tobacco-growing and a consideration of the experiences of good tobacco growers show that the amounts of ammonia and potash in the average tobacco fertilizers, as stated above, are not as large as are needed to give the best results. It would appear that the largest amount of ammonia (10 per cent) in any of these "specials" is greater than is required for bright tobacco, while the maximum quantity of potash (5 per cent) in any of the 108 brands is less than is used by numbers of our best bright tobacco growers, especially in the eastern part of the State. A considerable number of these growers either mix their own tobacco fertilizers or else have them put up according to formulas of their suggestion. Below are given five formulas for mixing fertilizers for tobacco. The grade of those fertilizers will be higher and they will, of course, cost more than the goods that are generally used in the State on tobacco, but we feel confident that the increased yield will more than justify the additional expense. In *The Bulletin* of the Department of Agriculture and in our correspondence with farmers we have been recommending formulas of about the composition of these for a number of years, and evidence is accumulating which shows that the character of tobacco fertilizers is undergoing quite a considerable change.

No. 1—

Acid phosphate, 14 per cent.....	750 pounds
Cotton-seed meal	900 pounds
Nitrate of soda.....	100 pounds
Sulphate of potash, high grade.....	250 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 6.3 per cent; potash, 6.9 per cent; nitrogen, 3.7 per cent (equal to ammonia, 4.5 per cent).

No. 2—

Acid phosphate	1,065 pounds
Dried blood, high grade.....	500 pounds
Nitrate of soda.....	125 pounds
Sulphate of potash, high grade.....	310 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.4 per cent; potash, 7.7 per cent; nitrogen, 4.3 per cent (equal to ammonia, 5.2 per cent).

No. 3—

Acid phosphate	875 pounds
Fish scrap	725 pounds
Nitrate of soda.....	100 pounds
Sulphate of potash, high grade.....	300 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 7.5 per cent; nitrogen, 3.8 per cent (equal to ammonia, 4.6 per cent).

No. 4—

Acid phosphate	1,000 pounds
Dried blood	500 pounds
Nitrate of soda.....	100 pounds
Sulphate of potash, high grade.....	400 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7 per cent; potash, 10 per cent; nitrogen, 4.1 per cent (equal to ammonia, 5 per cent).

No. 5—

Acid phosphate	900 pounds
Cotton-seed meal	700 pounds
Nitrate of soda.....	100 pounds
Sulphate of potash, high grade.....	300 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 7.7 per cent; nitrogen, 3.1 per cent (equal to ammonia, 3.8 per cent).

No. 6—

Acid phosphate	745 pounds
Cotton-seed meal	1,140 pounds
Sulphate of potash, high grade.....	115 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 6.6 per cent; potash, 3.7 per cent; nitrogen, 3.8 per cent (equal to ammonia, 4.6 per cent).

No. 7—

Acid phosphate	885 pounds
Dried blood	575 pounds
Nitrate of soda.....	170 pounds
Sulphate of potash, high grade.....	370 pounds
	<hr/>
	2,000 pounds

In this formula one-fourth of the nitrogen is derived from nitrate of soda and the other three-fourths from dried blood. This mixture

will contain: available phosphoric acid, 6.2 per cent; potash, 9.2 per cent; nitrogen, 5.2 per cent (equal to ammonia, 6.2 per cent).

Three hundred and fifty to one thousand pounds of these mixtures should be used to the acre.

The mixtures made from Formulas Nos. 2 and 3 are somewhat more concentrated than that from No. 1, on account of cotton-seed meal containing less ammonia than fish scrap and dried blood. The three formulas are given to enable the use of any one of the three main organic nitrogenous materials—dried blood, fish scrap and cotton-seed meal. In the coastal sections fish scrap and meal are both easily obtained; some distance inland meal is more accessible, while in the more western end of the tobacco belt it will be found convenient to use dried blood. All three are good sources of ammonia for tobacco. The other materials—nitrate of soda, sulphate of potash, and acid phosphate—are the same for all mixtures.

Occasional requests are made for formulas furnishing as much as 10 per cent of potash, and No. 4 has been arranged to meet needs of this nature. It is known that excellent tobacco, in quality and quantity, is grown by the use of fertilizers of this class, and some of our farmers greatly prefer them to others containing less potash. It takes considerable observation and experimentation to determine the best practice in matters of this kind.

Formula No. 7, last year, in some tobacco experiments conducted on the bright-leaf soils of Granville County, gave very promising results. Three hundred and eighty-eight pounds per acre of this mixture were used, which was equal to an application of 600 pounds of a mixture analyzing 4 per cent available phosphoric acid, 6 per cent potash and 4 per cent ammonia.

A limited quantity of stable manure is very beneficial to tobacco, and it succeeds well after peanuts. These materials add ammonia to the soil, and where heavy applications of fertilizers are to be made in connection with manure, and on peanut land, it would be well not to have so much ammonia in the fertilizers as is used in the ones employed on land not having other ammonia materials put on them. Formula No. 5 is destined to meet cases of this kind. A good many eastern tobacco growers plant tobacco after peanuts, and some of them grow peas between the hills of tobacco, planting them with hoes and putting six to ten peas in a place the latter part of June or early in July. This improves the soil for after-crops, but tobacco grown after tobacco and peas is said not to be of good quality, though, as would be expected, the growth is very large.

Good results will come from the use of high-grade fertilizers, such as are suggested above, or similar ones, and we believe that when once tried there will be no inclination to go back to the lower-grade ones now so largely used.

I. ANALYSES OF FERTILIZERS—FALL SEASON, 1905.
II. REGISTRATION OF FERTILIZERS.

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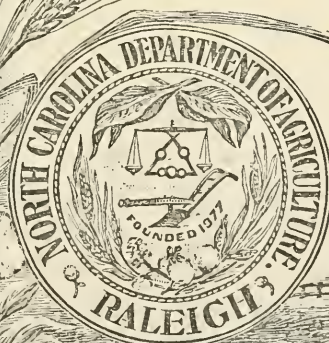
OF THE

NORTH CAROLINA

STATE BOARD OF

AGRICULTURE

Raleigh



MARCH, 1906.

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION.

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 3.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, MARCH, 1906.

I.—FERTILIZER ANALYSES—FALL SEASON, 1905.

BY B. W. KILGORE, STATE CHEMIST.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the department, under the direction of the Commissioner of Agriculture, during the fall months of 1905. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by, or before, the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in a condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is

thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and

potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the costs of fertilizing materials are liable to change as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1905

In Unmixed or Raw Materials.

For ammonia	14½	cents per pound.
For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in fine bone meal.....	3½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For ammonia	16½	cents per pound.
For phosphoric acid.....	4½	cents per pound.
For potash	5½	cents per pound.

The valuations decided on for this season, for the reasons already given, are:

VALUATIONS FOR 1906.

In Unmixed or Raw Materials.

Phosphoric acid in acid phosphate.....	4	cents per pound.
Phosphoric acid in bone meal.....	3½	cents per pound.
Ammonia	14½	cents per pound.
Potash	5	cents per pound.

In Mixed Fertilizers.

Phosphoric acid	41½ cents per pound.
Ammonia	161½ cents per pound.
Potash	51½ cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—2 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and ammonia 2 per cent, the calculation is made as follows:

Percentage or Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton 2,000 Lbs.
8 pounds available phosphoric acid at 4½ cents -----	$0.36 \times 20 =$	\$7.20
2 pounds potash at 5½ cents -----	$0.11 \times 20 =$	2.20
2 pounds ammonia at 16½ cents -----	$0.33 \times 20 =$	6.60
Total value -----	$0.80 \times 20 =$	16.00

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Nor- folk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance	\$3.20	\$3.20	\$3.40	\$3.20
Apex	2.70		3.80	3.00
Ashboro	3.20	3.20	3.60	3.20
Ashville	4.00	4.00	4.00	4.00
Chapel Hill	2.95	3.20	3.90	3.20
Charlotte	2.65	3.30	3.20	3.20
Clayton	2.48	2.86	3.63	2.83
Cherryville	3.85	3.60	3.40	3.60
Clinton	1.60	3.00	3.20	3.00
Creedmoor	3.00	3.00	3.80	3.00
Cunningham	3.00	2.40	4.00	2.40
Dallas	3.00	3.60	3.40	3.60
Davidson College	3.00	3.20	3.20	3.20
Dudley	1.70	3.00	3.20	3.00
Dunn	2.00	2.80	3.20	2.80
Durham	2.80	2.83	3.60	2.83
Elkin	3.60	3.20	3.60	3.20
Elm City	2.10	2.60	3.20	2.60
Fair Bluff	1.60	3.80	2.40	3.80
Fayetteville	1.80	3.00	3.00	3.00
Forestville	2.85	3.00	3.80	3.06
Gastonia	3.00	3.56	3.36	3.50
Gibson	2.10	3.50	3.50	3.50
Gold-boro	1.80	2.80	3.20	2.80
Greensboro	2.96	3.00	3.40	3.00
Hamlet	2.00	3.00	3.60	3.00
Henderson	2.95	3.00	3.80	3.00
Hickory	3.20	3.60	3.85	3.60
High Point	3.00	3.08	3.40	3.08
Hillsboro	2.88	2.88	2.68	2.88
Kernersville	3.00	3.00	3.40	3.00
Kinston	2.40	2.50	3.50	2.50
Laurel Hill	1.90	2.40	3.80	3.40
Laurinburg	1.90	3.40	3.80	3.40
Liberty	2.72	3.60	3.80	3.60
Louisburg	2.95	3.00	3.80	3.00
Lumberton	1.60	3.60	3.70	3.60
Macon	3.05	3.00	3.85	3.00
Madison	3.10	3.00	3.06	3.00
Matthews	2.60	3.20	3.20	3.20
Maxton	1.80	3.40	3.00	3.40
Milton	3.44	2.40	4.00	2.40
Mocksville	3.36	3.20	3.40	3.20
Morven	2.55	3.60	2.50	3.60
Mcunt Airy	2.20	3.40	3.80	3.40
Nashville	2.30	2.90	3.40	2.90
New Bern	1.80	1.75	3.95	1.79
Norwood	3.68	3.20	3.20	2.23
Oxford	3.04	2.83	3.80	2.83
Pineville	2.77	3.25	3.00	3.20
Pittsboro	2.60	3.30	4.10	3.30
Polkton	2.40	3.00	2.20	3.00
Raleigh	2.56	2.83	3.63	2.83
Reidsville	3.00	2.96	3.40	2.96
Rockingham	2.10	3.00	3.80	3.00
Rocky Mount	2.20	2.50	3.40	2.50
Ruffin	3.28	2.80	3.40	2.20
Rural Hall	3.28	3.20	3.60	3.20
Rutherfordton	3.05	3.65	3.40	3.65
Salisbury	3.25	3.20	3.20	3.20
Sanford	2.10	3.00	3.40	3.00
Selma	2.40	2.80	3.20	2.80
Shelby	2.95	3.60	3.40	3.60
Siler City	2.60	3.60	3.80	2.60
Smithfield	2.20	2.80	3.20	2.80
Statesville	3.50	3.20	3.60	3.20
Stem	2.95	2.83	3.80	2.83
Tarboro	2.30	2.40	3.00	2.40
Waco	2.90	3.60	3.40	3.60
Wadesboro	2.30	3.00	2.50	3.00
Walnut Cove	3.12	3.00	3.40	3.00
Warrenton	3.05	3.25	4.10	3.25
Warsaw	1.50	3.00	3.20	3.00
Washington	2.65	1.75	2.25	1.50
Weldon	2.55	1.90	3.85	1.90
Wilson	2.00	2.60	3.20	2.60
Winston-Salem	3.00	3.00	3.40	3.05

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1905.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.
				MIXED FERTILIZERS.										
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Potash.			
Brands claiming														
4612	American Agricultural Chemical Co., New York.	Zell's Bone Superphosphate.	Lexington	R	5.20	2.65	8.00	.48	1.48	2.00	1.00	\$14.90		
4666	Baugh & Sons Co., Norfolk, Va.	Baugh's Raw Bone Superphosphate and Ammoniated Dissolved Animal Bone.	Concord	R	6.18	2.72	8.90	.76	1.62	2.38	1.26	17.25		
4687	Reidsville Fertilizer Co., Reidsville, N. C.	Banner Fertilizer.	Reidsville.	R	4.83	3.21	8.04	.77	1.03	1.80	1.32	14.63		
4610	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Guano.	Lexington	D	4.90	2.55	7.45	.66	1.43	2.14	1.35	15.25		
4665	do	Old Dominion Standard Raw Bone Soluble Guano.	Ashboro	R	5.60	2.71	8.31	.72	1.30	2.02	.91	15.15		
4583	do	Travers' Beef Blood and Bone Fertilizer.	Wilkesboro	R	5.33	3.29	8.62	.70	1.20	1.90	1.00	15.13		
4641	do	Va. State Fertilizer Co.'s Highland King.	Centerville	R	6.15	2.74	8.89	.68	1.16	1.84	1.50	15.72		
Brand claiming														
4597	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	Mt. Airy	R	5.90	2.45	8.35	.94	1.70	2.00	1.50	15.45		
Brands claiming														
4642	Acme Mfg. Co., Wilmington, N. C.	Acme Special Grain Fertilizer.	Rural Hall	R	6.68	2.04	8.72	.06	1.98	2.04	1.57	17.95		
4725	do	Gem Fertilizer	Mt. Olive	R	6.50	1.93	8.43	.06	1.84	1.90	1.88	16.65		
4698	American Fertilizer Co., Norfolk, Va.	Bone and Peruvian Guano	Monroe	R	7.20	1.60	8.80	.84	1.10	1.94	1.96	16.01		
4608	American Agricultural Chemical Co., New York.	Lazaretto Crop Grower	Lexington	R	5.88	2.66	8.54	.82	1.34	2.16	2.67	17.26		
4667	Armour Fertilizer Works, Baltimore, Md.	Armour General Fertilizer.	Concord	R	4.78	1.62	6.40	.98	1.36	2.34	1.92	16.93		
4639	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Bone and Potash Compound.	Winston	R	3.60	5.08	8.68	.82	1.44	2.26	2.57	16.31		
4743	Bradley Fertilizer Co., Boston, Mass.	Bradley's Cereal Fertilizer	Concord	R	6.35	2.87	9.22	1.28	.88	2.36	2.67	18.21		
4681	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Fertilizer	Statesville	D	8.45	1.56	8.01	.80	1.88	2.16	2.43	18.10		
4733	Farmers Guano Co., Raleigh, N. C.	State Standard Guano.	Siler City	D	5.05	2.10	7.15	.49	1.80	2.18	2.24	16.87		
4734	Listers' Agricultural Works, Newark, N. J.	Listers' Success Fertilizer.	Siler City	R	5.40	2.59	7.99	.44	1.60	2.04	2.57	16.82		
											2.13	16.26		

4700	MacMurphy, W. C. Co., Charleston, S. C.	Special Cotton and Corn Guano.	Wadesboro	R	5.85	2.67	8.52	1.04	1.00	2.04	1.99	16.59
4653	Navassa Guano Co., Wilmington, N. C.	Navassa Grain Fertilizer.	Lexington	R	4.38	4.11	8.49	.86	1.42	2.28	1.90	17.25
4670	Patasco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano.	Concord	S	6.35	2.47	8.82	1.44	1.07	2.51	2.26	18.71
4614	Pocomoke Guano Co., Norfolk, Va.	Pamlico Superphosphate.	Lexington	R	6.40	2.19	8.59	.68	1.44	2.12	2.06	16.99
4617	Pocomoke Guano Co., Richmond, Va.	Premium Brand Fertilizer.	Monroe	R	3.53	4.98	8.51	.52	1.73	2.30	1.64	17.05
4713	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Special Wheat Fertilizer.	Kings Mountain	R	5.55	2.11	7.96	1.06	.98	2.04	2.09	16.19
4623	Swift Fertilizer Works, Atlanta, Ga.	Swift's Golden Grade Guano.	Rural Hall	R	5.48	2.89	8.37	.70	1.40	2.10	2.57	17.29
4671	---do---	Swift's Red Steer Guano.	Wilkesboro	R	6.35	3.11	9.46	.78	1.62	2.40	2.75	19.46
4671	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Fertilizer.	Concord	R	4.05	5.08	9.13	1.34	.90	2.24	1.72	17.50
4613	---do---	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Lexington	R	3.85	3.61	7.46	.52	1.56	2.08	2.25	16.05
4609	---do---	Old Dominion Guano Co.'s Soluble Guano.	Lexington	R	6.33	2.27	8.60	1.02	1.06	2.08	1.92	16.72
4686	---do---	Powers, Gibbs & Co. Eagle Brand Ammoniated Guano.	Reidsville	R	8.85	1.72	10.57	.90	.86	1.76	2.04	17.57
4640	---do---	Southern Chemical Co.'s Electric Standard Guano.	Centerville	R	4.08	3.72	7.80	.40	1.86	2.26	2.02	16.70
4680	---do---	Southern Chemical Co.'s Electric Tobacco Guano.	Walnut Cove	R	6.50	1.74	8.24	1.40	.92	2.32	2.34	17.65
4679	---do---	Tinsley & Co.'s Stonewall Tobacco Guano.	Stokesdale	R	5.80	2.12	7.92	.90	1.50	2.40	2.36	17.64
Brands claiming												
4668	Listers' Agricultural Chemical Works, Newark, N. J.	Listers' Ammoniated Dissolved Bone Phosphate.	Concord	R	5.35	2.94	8.00	1.64	1.02	2.50	2.00	17.65
4663	Navassa Guano Co., Wilmington, N. C.	Ammoniated Soluble Navassa Guano.	Greensboro	R	5.70	2.94	8.64	.54	2.04	2.58	2.01	18.50
Brand claiming												
4699	Crow Brothers, Monroe, N. C.	Crow Brothers' High Grade Wheat Fertilizer.	Monroe	D	6.53	2.12	8.35	.24	2.04	2.28	2.89	18.76
Brands claiming												
4582	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Planters Pride	Wilkesboro	R	7.63	.96	8.59	.40	1.98	2.50	3.00	18.75
4685	Powhatan Chemical Co., Richmond, Va.	White Leaf Tobacco Fertilizer.	Reidsville	R	4.78	3.45	8.23	.86	2.04	2.90	3.84	21.20
Brand claiming												
4729	Armour Fertilizer Works, Wilmington, N. C.	Armour's Berry King Fertilizer.	Clinton	R	6.03	3.18	9.21	1.67	.74	2.41	4.89	21.62
Brand claiming												
4712	Acme Mfg. Co., Wilmington, N. C.	Acme Fertilizer	Charlotte	R	7.10	1.78	8.88	.52	2.48	3.00	2.49	19.85
Brands claiming												
4728	Armour Fertilizer Works, Wilmington, N. C.	Armour's Cotton Special Fertilizer.	Clinton	R	6.70	2.23	8.33	.56	1.86	2.44	2.75	19.11
Brands claiming												
4696	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid Guano.	Concord	R	5.55	2.68	8.23	1.58	1.80	3.38	3.20	22.18
4726	Va.-Car. Chemical Co., Richmond, Va.	Norfolk and Carolina Chem. Co.'s Faison Amazon High Grade Manure.	Faison	R	5.93	2.21	8.14	1.52	1.70	3.22	4.17	22.54

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1905—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.								Relative Value per Ton at Factory.	
				Mechanical Condition.	MIXED FERTILIZERS.								
					Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Potash.		
MIXED FERTILIZERS.													
4652	Brand claiming— Ashepool Fertilizer Co., Charleston, S. C.	Ashepool Wheat and Oat Specific.	Lexington	D	5.40	4.26	9.00	.94	.98	2.00	1.00	15.80	
4724	Brands claiming Acme Mfg. Co., Wilmington, N. C.	Acme Cotton Grower	Mt. Olive	D	7.78	1.93	9.00	.82	1.78	2.75	2.00	19.38	
4727	Va.-Car. Chemical Co., Richmond, Va.	Prolific Cotton Grower	Falson	R	7.00	2.10	9.10	.63	2.04	2.67	2.33	19.88	
4664	Brand claiming Swift Fertilizer Works, Atlanta, Ga.	High Grade Swift's Blood and Bone Potash Guano.	Greensboro	R	7.35	2.18	9.25	.60	3.10	4.00	7.00	29.23	
4649	Brand claiming Armour Fertilizer Works, Baltimore, Md.	Armour's Ammoniated Bone Meal.	Winston	R	5.70	6.30	12.00	.96	1.14	2.10	—	16.50	
4650	Brand claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Pure Dissolved Animal Bone.	Rural Hall	S	3.13	11.95	13.00	1.58	1.60	2.50	—	19.95	
4691	Brand claiming Acme Manufacturing Co., Wilmington, N. C.	Acme Bone and Potash	Mt. Airy	R	4.48	4.11	8.00	—	—	—	2.00	9.40	
4690	Brands claiming Navassa Guano Co., Wilmington, N. C.	Warlick's Mixture	Redsville	R	8.08	2.76	8.00	—	—	—	2.25	9.67	
4600	Va.-Car. Chemical Co., Richmond, Va.	Solid South	Mt. Airy	R	4.80	3.48	8.28	—	—	—	1.81	11.75	
4736	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s McCrory's Diamond Bone and Potash Mixture.	Siler City	R	6.90	2.57	9.47	—	—	—	3.00	10.50	
4707	Brands claiming Richmond Guano Co., Richmond, Va.	Tip-Top Bone and Potash	Monroe	R	5.33	3.67	8.00	—	—	—	4.00	11.60	
4602	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Mt. Airy	D	2.90	5.28	8.18	—	—	—	3.30	11.73	
4625	Swift Fertilizer Works, Atlanta, Ga.	Swift's Plantation Standard Grade Phosphate and Potash.	Elkin	R	5.25	5.23	10.48	—	—	—	3.76	13.57	
4599	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Carr's Special Wheat Grower.	Mt. Airy	S	4.05	4.50	8.55	—	—	—	3.57	11.62	

4623	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Miller's Special Wheat Mixture.	Elkin	S	4.53	4.97	9.50	3.56	12.47
	Brands claiming								
4692	Union Guano Co., Winston, N. C.	Rockingham Bone and Potash	Reidsville	D	3.75	4.20	8.50	2.00	9.85
4583	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Dissolved Bone and Potash.	Wilkesboro	R	5.35	3.80	7.95	2.40	9.35
	Brand claiming							1.77	10.18
4656	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Quick Step Soluble Bone and Potash.	Kernersville	D	5.45	5.19	10.00	1.00	10.10
	Brand claiming							.90	10.57
4638	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Great Wheat and Corn Grower.	Roxboro	R	4.63	6.62	10.00	1.50	10.65
	Brands claiming							2.68	13.07
4717	Atlantic Chemical Co., Norfolk, Va.	Atlantic Bone and Potash Mixture.	Kings Mountain.	R	7.43	2.72	10.00	2.00	11.20
4586	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Electric Bone and Potash Mixture.	Wilkesboro	R	6.55	3.52	10.07	1.94	11.27
4718	Columbia Guano Co., Norfolk, Va.	Columbia Bone and Potash Mixture.	Kings Mountain.	R	7.50	2.87	10.37	2.29	11.58
4183	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone and Potash.	Reidsville	R	8.23	2.91	11.14	1.71	11.21
4716	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Kings Mountain.	R	7.70	3.47	10.17	1.64	11.83
4626	Swift Fertilizer Works, Atlanta, Ga.	Swift's Wheat Grower Standard Grade Phosphate and Potash.	Rural Hall	R	5.60	5.31	10.91	2.00	11.35
4654	Union Guano Co., Winston, N. C.	Union Bone and Potash	Lexington	D	9.60	.50	10.10	2.33	12.38
4624	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s High Grade Alkaline Bone.	Rockford	D	4.90	6.62	11.52	2.04	11.33
4604	do	Davie & Whittle's Owl Brand Acid Phosphate with Potash.	Pilot Mountain.	D	5.28	5.36	10.64	1.73	12.27
4703	do	Durham Fertilizer Blue Ridge Wheat Grower.	Salisbury	D	6.43	4.52	10.91	1.66	11.40
4627	do	Norfolk and Car. Chem. Co.'s Norfolk Bone and Potash.	Elkin	R	4.48	5.60	10.08	1.97	11.99
	Brands claiming							1.90	11.16
4674	Baugh & Sons Co., Norfolk, Va.	Randolph's High Grade Bone and Potash.	Ashboro	R	3.70	6.85	10.00	3.00	12.30
4673	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Morris & Scarboro Special Bone and Potash Mixture.	do	S	6.88	4.53	11.41	3.63	13.49
4738	Brands claiming							2.78	13.33
4739	Acme Mfg. Co., Wilmington, N. C.	Acme Bone and Potash	Liberty	D	7.85	3.07	10.00	4.00	13.40
4739	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Potash Mixture.	do	R	4.25	5.75	10.00	3.62	13.81
4708	Grow Brothers, Monroe, N. C.	Grow Bros.' High Grade Grain Mixture.	Monroe	R	5.95	2.04	8.04	3.86	13.25
4704	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Bone and Potash Mixture.	Norwood	D	6.60	3.88	10.48	6.22	14.08
4675	Union Guano Co., Winston, N. C.	Quaker Grain Mixture	Ashboro	D	6.28	4.19	10.47	4.41	14.28
								4.09	13.92

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

4592	Richmond Guano Co., Richmond, Va.	Premium Dissolved Bone	Wilkesboro	R	8.73	4.56	13.39	10.71
4590	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade Dissolved Bone.	Elkin	D	9.58	4.24	13.52	11.06
4620	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's I. X. L. Acid Phosphate.	Lexington	R	6.43	7.01	13.44	10.75
4659	-----do-----	Davie & Whittle's Owl Brand High Grade Acid Phosphate.	Lexington	D	7.58	6.93	14.51	11.61
4616	-----do-----	Durham Fertilizer Co.'s Double Bone Phosphate; Extra Strong.	Lexington	R	6.58	6.65	13.23	10.58
4621	-----do-----	Old Dominion Guano Co.'s High Grade Bone Phosphate.	Lexington	R	8.30	5.60	13.90	11.12
4595	-----do-----	S. W. Travers' Standard S. C. Dissolved Bone.	Wilkesboro	R	7.68	7.03	14.71	11.77
4723	-----do-----	Va. State Fert. Co.'s Clipper Brand Acid Phosphate.	Hickory	D	8.98	6.09	14.07	11.26
Brands claiming								
4730	Acme Mfg. Co., Wilmington, N. C.	Acme High Grade Acid Phosphate.	Mt. Olive	D	10.73	3.28	14.01	11.20
4617	American Agricultural Chemical Co., New York.	Lazaretto Dissolved Bone	Lexington	R	11.93	3.31	15.24	12.19
4658	Ashepoo Fertilizer Co., Charleston, S. C.	Ashepoo XXXX Acid Phosphate.	Lexington	D	11.33	4.25	15.58	12.46
4720	Atlantic Chemical Co., Norfolk, Va.	Atlantic 14 Per Cent Acid Phosphate.	Kings Mountain.	R	11.48	3.55	15.03	12.02
4710	Crow Bros., Monroe, N. C.	Crow Brothers' Acid Phosphate.	Monroe	R	11.68	3.12	14.80	11.84
4741	Navassa Guano Co., Wilmington, N. C.	Navassa 14 Per Cent Acid Phosphate.	Siler City	D	11.63	2.79	14.42	11.54
4683	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate.	Advance	D	11.03	3.67	14.70	11.76
4633	Swift Fertilizer Works, Atlanta, Ga.	Swift's Cultivator High Grade Acid Phosphate.	Rockford	D	10.83	4.69	15.52	12.42
4711	Va.-Car. Chemical Co., Richmond, Va.	V. C. C. Co.'s 14 Per Cent Acid Phosphate.	Wadesboro	R	11.90	3.02	14.92	11.94
Brands claiming								
4721	Atlantic Chemical Co., Norfolk, Va.	Atlantic 16 Per Cent Acid Phosphate.	Kings Mountain.	R	13.10	3.16	16.26	13.01
4592	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	16 Per Cent Acid Phosphate.	Wilkesboro	R	11.63	4.02	15.65	12.52
4635	Union Guano Co., Winston, N. C.	Union 16 Per Cent Acid Phosphate.	Elkin	D	10.55	5.52	16.07	12.86
4622	Va.-Car. Chemical Co., Richmond, Va.	V. C. C. Co.'s 16 Per Cent Acid Phosphate.	Lexington	R	11.03	5.86	16.39	13.51
Brands claiming								
4731	Acme Mfg. Co., Wilmington, N. C.	Pure German Kainit	Mt. Olive	S			12.00	12.00
4732	Va.-Car. Chemical Co., Richmond, Va.	Genuine German Kainit	Faison	S			11.94	11.94
4637	Lee, A. S., & Son, Richmond, Va.	Lee's Prepared Agricultural Lime.	Rockford	R			2.00	2.00
							2.01	2.01

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ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1905—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.							Relative Value per Ton at Factory.
					Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Potash.	
RAW OR UNMIXED FERTILIZER MATERIALS.												
4662	Brand claiming Swift & Co., Chicago, Ill.	Swift's Pure Bone Meal	Kernersville	D							3.00	*27.66
4607	Brand claiming Union Guano Co., Winston, N. C.	Union Raw Bone Meal	Pilot Mountain	S							3.50	†30.57
4651	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	V. C. Co.'s Pure Raw Bone	Rural Hall	S							4.50	‡30.60
4742	Brand claiming Smith-Davis Co., Wilmington, N. C.	Genuine Peruvian Guano	Statesville	R							5.30	‡30.60
											3.60	4.25
											3.42	4.13
												‡31.09

* Total Phosphoric Acid found, 26.30, valued at 3¼ cents per pound.

† Total Phosphoric Acid found, 21.05, valued at 3½ cents per pound.

‡ Total Phosphoric Acid found, 21.75, valued at 3½ cents per pound.

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; Y—lumpy; W—wet.

FERTILIZER BRANDS REGISTERED FOR 1906.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The American Agricultural Chemical Co., New York, N. Y.—</i>			
Zell's 10 Trucker.....	5	10	3
Zell's 7 Per Cent Potato and Vegetable Manure...	6	7	5
Zell's Truck Grower.....	7	5	5
Zell's Special Compound for Potatoes and Vege- tables	8	3	4
Zell's Tobacco Fertilizer	8	3	4
Zell's Bright Tobacco Grower.....	8	3	3
Zell's Reliance High Grade Manure.....	8	3	3
Zell's Victoria Animal Bone Compound.....	9	2.25	4
Zell's Magnet	8	2.50	2
Zell's Royal High Grade Fertilizer.....	9	2.50	2
Zell's Fish Guano	8	2	2
Zell's Calvert Guano	8	2	2
Zell's Animal Bone Superphosphate.....	8	2	1
Zell's High Grade Potash Fertilizer.....	10	..	4
Zell's Electric Phosphate.....	10	..	2
Zell's Dissolved Bone Phosphate.....	14	..	..
Reese Dissolved Phosphate of Lime.....	14	..	..
Reese Crown Phosphate and Potash.....	11	..	2
Reese Pacific Guano	8	2	2
Reese Pacific Guano for Tobacco.....	8.50	3	2.50
Maryland Globe Complete Manure.....	8	2	2
Maryland Dissolved S. C. Bone.....	14	..	..
Lazaretto Challenge Fertilizer.....	8	3	3
Lazaretto Special for Tobacco and Peanuts.....	8	3	3
Lazaretto Universal Compound	8	2.50	2
Lazaretto Climax Plant Food.....	8	2.50	3
Lazaretto Retriever Animal Bone Fertilizer.....	9	2.25	4
Lazaretto Crop Grower	8	2	2
Lazaretto High Grade Dissolved Bone and Potash,	12	..	5
Lazaretto Alkaline Bone Phosphate	12	..	3
Lazaretto Dissolved Bone and Potash	10	..	2
Lazaretto Acid Phosphate	14	..	..
Slingluff's British Mixture	8	2.50	2.50
Clark's Orinoco Tobacco Fertilizer.....	8	3	4
Detrick's Special Tobacco Fertilizer.....	8	3	4
Detrick's Quickstep Bone Phosphate.....	8	3	4
Detrick's Special High Grade	8	3	3
Detrick's Vegetable Ammonia Superphosphate....	8	2.50	3
Detrick's Soluble Bone Phosphate and Potash....	10	..	2
Detrick's P. & B. Special Fertilizer.....	12	..	3
Detrick's Fish Mixture	8	2	2
Detrick's Royal Crop Grower	8	2	2
Detrick's Kanguaroo Complete Kompond.....	8	2	3
Detrick's Superior Animal Bone Fertilizer.....	9	2.25	4
Detrick's XXtra Acid Phosphate	14	..	..
Square Deal Phosphate for General Crops.....	8	2	4
Canton Chemical Baker's Dissolyed S. C. Bone....	14	..	..
Canton Chemical Soluble Bone and Potash.....	10	..	2
Canton Chemical Soluble Alkaline Bone.....	12	..	3
Canton Chemical Game Guano.....	8	2	2
Canton Chemical Colonial Compound.....	9	2	2
Canton Chemical Animal Bone Fertilizer.....	9	2.25	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Canton Chemical Virginia High Grade Manure...	8	2.50	2
Canton Chemical Baker's Standard High Grade Guano	8	2.50	3
Canton Chemical Baker's Tobacco Fertilizer.....	8	3	3
Canton Chemical Superior High Grade Guano....	8	3	3
Canton Chemical Excelsior Trucker.....	7	5	2
Canton Chemical Trucker's Special 7 Per Cent Guano	6	7	5
16 Per Cent Superphosphate	16	..	..
Kainit .....	..	..	12
Triumph Alkaline Bone.....	8	..	5
W. P. Baugham's Honey Pod Pride.....	8	4	5
W. P. Baugham's Cottage Grove Special Trucker..	6	9	4
Young's Melon Fertilizer.....	10	3	10
Savage, Son & Co.'s Purity Guano.....	8	2	2
Holmes & Dawson Triumph Soluble.....	8	2	2
Holmes & Dawson Gold Dust Guano.....	9	2	2
Holmes & Dawson Productive Cotton and Peanut Grower.....	9	2.25	2
Victor Bone and Potash.....	8	..	3
Ground Fish Scrap.....	..	11	..
Pure Ground Bone.....(Total)	45	4	..

George L. Arps & Co., Norfolk, Va.—

Big Yield Guano	8	2	2
14 Per Cent Acid Phosphate.....	14	..	..
High Grade Premium Guano for Cotton, Tobacco and all Spring Crops.....	8	2	2
Kainit .....	..	..	12
Arp's Potato Guano.....	6	7	5
Arp's Standard Truck Guano.....	7	5	5

Atlantic Chemical Co., Norfolk, Va.—

Atlantic Soluble Guano	8	2	2
Atlantic H. G. Cotton Guano.....	8	3	3
Atlantic Special Guano	8	2	1
Atlantic Cotton Grower	8	2.50	1
Atlantic Meal Compound	9	2.75	2
Atlantic H. G. Tobacco Guano.....	8	3	3
Atlantic Tobacco Compound	8	2.50	2
Atlantic Tobacco Grower	8	2.50	3
Atlantic 7 Per Cent Truck Guano.....	7	7	7
Atlantic Special Truck Guano.....	8	4	4
Atlantic Potato Guano	7	5	5
Atlantic Special Wheat Fertilizer.....	8	2	2
Atlantic Bone and Potash Mixture.....	10	..	2
Atlantic 10 and 4 Bone and Potash Mixture.....	10	..	4
Atlantic 8 and 2 Bone and Potash Mixture.....	8	..	2
Atlantic 8 and 4 Bone and Potash Mixture.....	8	..	4
Atlantic Bone and Potash for Grain.....	10	..	3
Atlantic H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Atlantic 14 Per Cent Acid Phosphate.....	14	..	..
Atlantic H. G. Dissolved Bone.....	13	..	..
Atlantic Acid Phosphate	12	..	..
Oriental H. G. Guano	8	4	4
Perfection Peanut Grower	7	..	5
Genuine German Kainit .....	..	..	12
Nitrate of Soda .....	..	19	..
Muriate of Potash .....	..	..	48

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Sulphate of Potash .....	..	..	50
Cotton-seed Meal .....	..	7.50	..
Atlantic H. G. Cotton Guano.....	8	3	3

Anderson Phosphate and Oil Co., Anderson, S. C.—

Anderson High Grade Phosphate.....	13
Anderson Special Dissolved Bone.....	14	..	..
Anderson Blood and Bone Guano.....	8	2	2
Anderson Soluble Guano	8	2	1
Anderson Truck Fertilizer	8	4	4
Anderson Cotton Fertilizer.....	8	2	2
Anderson Blood Guano	8	2	2
Anderson Wheat Grower	8	2	2
Anderson Special Fertilizer	8	3	3
Anderson High Grade Petrified Bone and Potash..	10	..	4
Anderson Special Petrified Dissolved Bone.....	15	..	..
Anderson Petrified Bone and Potash.....	10	..	2
Anderson Standard Petrified Bone Guano.....	8	2	2
Anderson XX Potash Bone.....	10	..	2
Anderson XXX Potash Bone.....	8	..	4
Anderson XXXX Potash Bone.....	10	..	4
Anderson Superphosphate	16	..	..
Anderson Kainit .....	..	..	12

A. D. Adair & McCarty, Atlanta, Ga., and Chattanooga, Tenn.—

David Harum High Grade Guano.....	10	4	4
Adair's High Grade Blood and Bone.....	10	3	3
Adair's High Grade Dissolved Bone No. 16.....	16	..	..
Adair's Special Potash Mixture	8	..	4
Adair's Wheat and Grass Grower.....	10	..	4
Adair's High Grade Potash Compound.....	10	..	4
Adair's High Grade Dissolved Bone.....	14	..	..
Adair's Dissolved Bone.....	12	..	..
McCarty's Potash Formula	12	..	2
McCarty's Potash Formula No. 4.....	12	..	4
McCarty's High Grade Cotton Grower.....	10	2	2
Planter's Soluble Fertilizer	8	2	2
A. & M. 13-3	13	..	3
A. & M. 13-4	13	..	4
Adrian's Ammoniated Dissolved Bone.....	8	2	2
Special Cotton Compound	10	2	4
Old Fine Fish Scrap Guano.....	10	2	2

American Fertilizer Co., Norfolk, Va.—

Ten Per Cent Ammonia Guano.....	7	10	2.50
Standard 7 Per Cent Ammonia Guano.....	7	7	5
Special Potato Manure	6	5	7
American Irish Potato Grower	7	5	5
American 7-7-7 for Irish Potatoes	7	7	7
Special Potato Guano	7	5	7
Strawberry Guano	9	3.50	9
Kale, Spinach and Cabbage Guano.....	7	5	4
Low Grade Special Formula Guano.....	7	4	4
Stable Manure Substitute	7	3	4
American Ammoniated Bone	8	2	1
Peruvian Mixture	8	2	1.50
Bone and Peruvian Guano.....	8	2	2
Bone and Peruvian Guano for Tobacco.....	8	2	2
Blood and Bone Compound	8	2.50	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
American Cotton Compound	8	2	2
American Eagle Guano	8	3	3
Bob White Fertilizer for Tobacco	8	2.50	2.50
J. G. Miller & Co.'s Yellow Leaf Fertilizer.....	8	3	3
A. L. Hannah Special Formula Guano.....	8	2	2
Special Formula Guano for Yellow Leaf Tobacco..	9	3.50	5
Murray's Special Fertilizer	8	3	3
Pitt County Special Fertilizer	9	3.50	5
Peruvian Mixture Guano, especially prepared for sweet potatoes	8	4	5
Johnson's No. 1 Fertilizer	8	2.50	3
High Grade Acid Phosphate	14	..	..
American High Grade Acid Phosphate.....	16	..	..
Eagle High Grade Acid Phosphate.....	13	..	..
Acid Phosphate	12	..	..
Acid Phosphate	10	..	..
Bone and Peruvian Guano	8.50	2	2.10
American Special Potash Mixture for Wheat.....	8	..	4
Dissolved Bone and Potash for Corn and Wheat..	10	..	2
Double Dissolved Bone and Potash.....	10	..	4
Pure Dissolved Bone	14	2.50	..
Bone Meal	21	3.50	..
Tankage.....	..	7	..
Ground Fish Scrap .....	..	10	..
Genuine German Kainit .....	..	..	12
Sulphate of Potash .....	..	..	49
Muriate of Potash.....	..	..	50
Sulphate of Ammonia .....	..	25	..
Nitrate of Soda .....	..	19	..
W. B. Cooper's Cape Fear Acid.....	12	..	..
W. B. Cooper's High Grade Fertilizer.....	8	3	3
W. B. Cooper's Cotton Grower.....	8	2	2
W. B. Cooper's High Grade Acid.....	14	..	..
W. B. Cooper's Pure German Kainit.....	..	..	12

Ashepool Fertilizer Co., Charleston, S. C.—

Ashepool Fertilizer	9	2.25	1
Ashepool Harrow Brand Raw Bone Superphos- phate.....	9	2	2
Ashepool Wheat and Oat Specific.....	9	2	1
Ashepool XXX Guano.....	8.65	2	2
Ashepool XX Guano	8.50	2	2
Ashepool Fruit Grower	8	4.75	2.75
Ashepool Perfection Guano	8	4	6
Ashepool High Grade Guano.....	8	4	4
Ashepool Golden Tobacco Producer.....	8	3	3
Ashepool Bird and Fish Guano.....	8	3	3
Ashepool X Tobacco Fertilizer.....	8	3	3
Ashepool Meal Mixture	8	3	3
Ashepool Special Cotton-seed Meal Guano.....	8	3	3
Ashepool High Grade Ammoniated Superphosphate,	8	3	2
Ashepool Circle Guano.....	8	2.50	2
Ashepool Guano	8	2.50	1
Ashepool Special Fertilizer	8	2	2
Ashepool Farmers' Special.....	8	2.50	3
Ashepool Truck Guano	7	5	5
Ashepool Vegetable Guano.....	5	5	5
Ashepool High Grade Acid Phosphate and Potash..	12	..	1
Ashepool Potash Acid Phosphate.....	11	..	1
Ashepool Potash Compound	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Ashepoo Superpotash Acid Phosphate.....	11	..	4
Ashepoo Dissolved Phosphate	16	..	..
Ashepoo XXXX Acid Phosphate.....	14	..	..
Ashepoo XXX Acid Phosphate.....	13	..	..
Ashepoo High Grade Acid Phosphate.....	13	..	..
Ashepoo Dissolved Bone	12	..	..
Ashepoo XX Acid Phosphate.....	12	..	..
Eutaw XX Acid Phosphate.....	12	..	..
Eutaw High Grade Acid Phosphate.....	13	..	..
Eutaw Superpotash Acid Phosphate.....	10	..	4
Eutaw Potash Acid Phosphate.....	11	..	1
Eutaw High Grade Phosphate and Potash.....	12	..	1
Eutaw Circle Guano.....	8	2.50	2
Eutaw X Golden Fertilizer.....	8	3	4
Eutaw Special Cotton-seed Meal Guano.....	8	3	4
Eutaw XX Guano	8.50	2	2
Eutaw XXX Guano.....	9	2	2
Eutaw Fertilizer	9	2.25	1
Enoree Acid Phosphate and Potash.....	10	..	2
Carolina High Grade Acid Phosphate.....	13	..	..
Carolina Guano	8	2	2
Carolina XXX Guano.....	8	3	3
Circle Bone	13	..	..
Coomassie Acid Phosphate.....	12	..	..
Coomassie Circle Fertilizer.....	8	2	2
Bronwood Acid Phosphate	8	..	4
P. D. Fertilizer	8	2	1
Palmetto Potash Acid Phosphate.....	11	..	1
Taylor's Circle Guano.....	9	2	4
German Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	45
Ashepoo Watermelon Guano.....	10	4	5

Acme Manufacturing Co., Wilmington, N. C.—

Acme Acid Phosphate Rock.....	13
Acme High Grade Acid Phosphate.....	14	..	..
Acme Special Grain	8	2	2
Acme Fertilizer	8	3	2.50
Acme Truck Grower.....	6	4	8
Acme Fertilizer for Tobacco.....	8	3	2.50
Acme Soluble Guano.....	8	2.50	1
Acme Standard Guano.....	8	2.50	2
Acme Cotton Grower	9	2.75	2
Acme High Grade Guano.....	6	6	8
Tip Top Crop Grower.....	8	2.50	3
Pee Dee Special.....	8	3	3
Gem Fertilizer	8	2	2
Quick Step Fertilizer.....	8	4	4
Lattimore's Complete Fertilizer.....	8	2.50	2
Cotton-seed Meal Guano.....	8	2	2
Acid Phosphate	12	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Strawberry Top Dresser.....	8	2	4
Bone and Potash 11 and 2.....	11	..	2
Bone and Potash 8 and 4.....	8	..	4
Bone and Potash 8 and 3.....	8	..	3
Bone and Potash 8 and 2.....	8	..	2
Bone and Potash 10 and 4.....	10	..	4
Bone and Potash 10 and 3.....	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bone and Potash 10 and 2.....	10	..	2
Pure German Kainit.....	12
Nitrate of Soda 18 Per Cent.....	..	18	..
Muriate of Potash	48
Sulphate of Potash	48

The Armour Fertilizer Works, Baltimore, Md.—

13 Per Cent Acid Phosphate.....	13	..	..
Star Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Phosphate and Potash	10	..	2
Phosphate and Potash No. 2.....	8	..	5
Superphosphate and Potash	10	..	4
Wheat Grower	10	..	4
Phosphoric Acid and Potash.....	10	..	5
General	8	2	2
Fruit and Root Crop Special.....	8	2	5
High Grade Potato.....	8	2	10
Bone and Dissolved Bone and Potash.....	9	2	3
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Cotton Special	8	3	3
Ammoniated Bone with Potash.....	6	3	2
Tobacco Special	8	3	3
African Cotton Grower.....	9	3	3
Truck and Berry Special.....	8	3	10
Manure Substitute	6	4	4
Special Trucker	8	4	4
Bone, Blood and Potash.....	8	5	7
All Soluble	8	3.50	4
7 Per Cent Trucker.....	6	7	5
Top Dresser	5	10	2
10 Per Cent Trucker.....	5	10	3
Acidulated Bone Meal.....	18	12	..
Bone Meal	24	3	..
Raw Bone	23	4.50	..
Dried Blood .....	..	16	..
German Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of potash.....	..	..	50
Fish Mixture	8	2	2
Blood and Bone.....	8	3	3
Tankage	9	8	..
Fish Scrap	7	11	..
Kainit .....	..	..	16

Asheville Packing Co., Asheville, N. C.—

Zimmerman's Blood and Bone Fertilizer.....	10.46	4.34	2.80
Zimmerman's Standard	9.30	3.80	2.80
Zimmerman's Wheat and Potato Fertilizer.....	6.45	3.67	3.31
Zimmerman's Garden Fertilizer.....	8	5	5

Baugh & Sons Co., Norfolk, Va.—

Glover's Special Potato Guano.....	7	4	8
Baugh's Dissolved Animal Bone.....	13	2.50	..
Baugh's New Process 10 Per Cent Guano.....	5	10	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Baugh's 7 Per Cent Potato Guano.....	6	7	5
Baugh's Cabbage Guano.....	6	7	5
Baugh's Peruvian Guano Substitute.....	6	5	7
Baugh's Fruit and Berry Guano.....	8	3	10
Baugh's High Grade Tobacco Guano.....	8	..	3
Baugh's Grand Rapid Guano.....	8	3	3
Grand Rapid High Grade Truck Guano.....	8	3	3
Baugh's Animal Bone and Potash Compound for all crops	8	2	2
Baugh's Wheat Fertilizer for Wheat and Grass...	8	2	2
Baugh's Fish Mixture	8	2	2
Baugh's Soluble Alkaline Superphosphate.....	10	..	2
Baugh's High Grade Potash Mixture.....	10	..	4
Baugh's Double Eagle Twenty-five Phosphate, or Raw Bone Superphosphate.....	8	2	1
Baugh's Peruvian Guano Substitute, for Potatoes and all vegetables.....	6	5	7
Baugh's Raw Bone Meal, warranted pure (Total),	21.50	4.50	..
Baugh's High Grade Acid Phosphate.....	14	..	..
16 Per Cent Acid Phosphate	16	..	..
Fish Bone and Potash.....	8	4	4
Ground Fish .....	..	10	..
Genuine German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..

Baltimore Fertilizer Co., Baltimore, Md.—

Honest Potato and Tomato Grower.....	8	3	3
Honest Trucker	6	5	5
Honest Revenue	7	3	6
Honest Sweet Potato Grower.....	8	2	4
Honest Dixie Crop Grower.....	8	2	2
Honest Albemarle Trucker	6	5	7

*Bradley Fertilizer Co., Boston, Mass., and
Charleston, S. C.—*

B. D. Sea Fowl Guano.....	9	2.25	1
Bradley's Patent Superphosphate.....	9	2.25	1
Bradley's High Grade Guano.....	8	3	3
Bradley's X Guano	8	2	2
Bradley's Ammoniated Dissolved Bone.....	8	2.25	1
Bradley's Eagle Ammoniated Bone Superphos- phate	8	2.25	1
Bradley's Cereal Guano.....	8	2	2
Bradley's Wheat Grower.....	10	..	2
Bradley's High Grade Acid Phosphate.....	14	..	..
Bradley's XXX Acid Phosphate.....	13	..	..
Bradley's Acid Phosphate.....	12	..	..
Bradley's Palmetto Acid Phosphate.....	12	..	..
German Kainit .....	..	..	12
Bradley's Bone and Potash.....	10	..	2

James Bonday, Jr., & Co., Baltimore, Md.—

Old Reliable Brand Genuine German Kainit....	..	..	12
No. 1 Syndikat Muriate of Potash.....	..	..	50
No. 1 Syndikat Sulphate of Potash.....	..	..	48
Nitrate of Soda.....	..	18	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Battleboro Oil Co., Battleboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Resolute Acid Phosphate.....	16	..	..
Laurel Potash Mixture.....	10	..	2
Berkley Plant Food.....	10	..	4
Berkley Acid Phosphate.....	14	..	..
Berkley Ammoniated Superphosphate.....	8	2	1
Select Crop Grower	8.50	2.50	2.50
Brandon Superphosphate	8	2	2
Monitor Animal Bone Fertilizer.....	9	2.25	4
Berkley Tobacco Guano.....	8	3	3
Advance Crop Grower.....	8	3	3
Victory Special Crop Grower.....	7	4	4
Royal Truck Grower.....	6	7	5
Mascot Truck Guano.....	7	5	5
Berkley Bone and Potash Mixture.....	11	..	2
Berkley Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
<i>Big Lick Cotton Seed Oil Mill Co., Big Lick, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Acid Phosphate	14	..	..
Burton's High Grade.....	8	2.50	3
Burton's Butcher Bone.....	8	2	2
Burton's Carolina Guano.....	8	2	1
Burton's Best	8	3	3
Burton's Soluble Guano.....	8	2	1
Tobacco Queen	8	3	3
High Grade Tobacco.....	8	4	4
<i>William Bragaw & Co., Washington, N. C.—</i>			
Tar Heel Special Guano.....	8	2	2
Pamlico Trucker	7	5	8
Havana Tobacco Guano.....	8	3	3
Beaufort County Guano.....	8	3	3
Tuckahoe Tobacco Guano.....	8	2.50	3
Cchocowinity Special Tobacco.....	5	4	6
Old reliable Premium.....	8	2	2
Cotton-seed Meal .....	..	7.50	..
<i>Blackstone Guano Co., Blackstone, Va.—</i>			
Red Letter	8	2	2
Alliance for Tobacco.....	8	2	2
Old Bellefonte	8	4	2
Bellefonte	8	3	2
Hard Cash	8	2.50	2
Alliance	8	2	2
B. G. Co. Acid Phosphate.....	14	..	..
B. G. Co. Bone and Potash.....	10	..	2
Jim Crow	8	3	2
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano	8	3	3
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Columbia Guano Co., Norfolk, Tarboro, Columbia, S. C., Macon, Ga.—</i>			
Olympia Cotton Guano.....	8	3	3
Columbia Soluble Guano.....	8	2	2
Columbia C. S. M. Special.....	9	2.75	2
Columbia H. G. Special Tobacco Guano.....	8	2.50	2
Columbia 7 Per Cent Truck Guano.....	7	7	7
Columbia Special Truck Guano.....	8	4	4
Columbia Potato Guano.....	7	5	5
Columbia Special 4-8-3.....	8	4	3
Columbia Special Wheat Fertilizer.....	8	2	2
Columbia Bone and Potash Mixture.....	10	..	2
Columbia 10-4 Bone and Potash Mixture.....	10	..	4
Columbia 8-2 Bone and Potash Mixture.....	8	..	2
Columbia 8-4 Bone and Potash Mixture.....	8	..	4
Columbia Bone and Potash for Grain.....	10	..	3
Columbia H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Columbia 14 Per Cent Acid Phosphate.....	14	..	..
Columbia Acid Phosphate.....	12	..	..
Columbia H. G. Dissolved Bone.....	13	..	..
Rex Brand Ammoniated Guano.....	8	2.50	1
Crown Brand Peanut Guano.....	7	..	5
Carolina Soluble Guano.....	8	2	1
Pelican Ammoniated Guano.....	8	4	4
Hyco Tobacco Guano.....	8	3	3
McRae's High Grade Guano.....	8	4	7
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	48
Nitrate of Soda.....	..	19	..
Columbia 8-2.25 Bone and Potash Mixture.....	8	..	2.25
Columbia Special	8	4	3
McRae's Special	8	5	7
Hayes' Special	8	4	3
Crews' Special	5.85	5.45	10
<i>Cumberland Bone Phosphate Co., Portland, Me., and Charleston, S. C.—</i>			
Cumberland Bone Superphosphate of Lime.....	8	2.25	1
<i>Cotton Oil and Fibre Co., Norfolk, Va.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Consumers Cotton Oil Co., Tarboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Chatham Cotton Oil Co., Pittsboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Campobello Oil Mill, Campobello, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>The Cotton and Ginning Co., Scotland Neck, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Chickamauga Cotton Compound.....	10	2	4
Chickamauga High Grade Plant Food.....	10	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Chickamauga High Grade Fertilizer.....	10	2	2
Chickamauga Complete Fertilizer.....	8	2	2
Chickamauga Alkaline Bone.....	8	..	4
Chickamauga Bone and Potash.....	10	..	2
Chickamauga Wheat and Corn Grower.....	10	..	4
Chickamauga Dissolved Bone.....	12	..	2
Chickamauga High Grade Dissolved Bone.....	14	..	..
Chickamauga High Grade Dissolved Bone No. 16..	16	..	..
Chickamauga 12-2	12	..	2
Chickamauga 12-4	12	..	4
Chickamauga 13-4	13	..	4
Chickamauga 13-2	13	..	2
Ben Hur High Grade Guano.....	10	3	3
Georgia Homestead Guano.....	8	2	2
Chickamauga Fish Scrap Guano.....	10	2	2
<i>Calder Bros., Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
<i>W. B. Cooper, Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	50
<i>Cowell, Swan & McCotter Co., Bayboro, N. C.</i>			
Cowell, Swan & McCotter Co.'s Cabbage Guano...	5	10	2.50
Cowell, Swan & McCotter Co.'s Great Cabbage and Potato Guano	7	7	7
Cowell, Swan & McCotter Co.'s Oriental Trucker..	6	6	6
Cowell, Swan & McCotter Co.'s H. G. Truck Guano,	7	5	5
Cowell, Swan & McCotter Co.'s Potato Favorite Guano	7	4	7
Cowell, Swan & McCotter Co.'s Champion Guano..	8	3	3
Cowell, Swan & McCotter Co.'s Quick Grower Guano	8	2.50	3
Cowell, Swan & McCotter Co.'s Standard Cotton Grower	8	4	3
Cowell, Swan & McCotter Co.'s Rust Proof Cotton Guano.....	8	2	3
Cowell, Swan & McCotter Co.'s Bone and Fish Guano	8	2	2
Cowell, Swan & McCotter Co.'s Crop Grower.....	8	2	2
Cowell, Swan & McCotter Co.'s 14 Per Cent Acid Phosphate	14	..	..
Cowell, Swan & McCotter Co.'s Bone Phosphate...	14	..	..
Cowell, Swan & McCotter Co.'s Bone Potash Com- pound	10	..	2
Cowell, Swan & McCotter Co.'s Fish and Kainit Compound	5	4	3
German Kainit .....	..	..	12
Aurora Trucker	7	5	7
<i>The Coe-Mortimer Co., Charleston, S. C.—</i>			
Peruvian Guano Ex Condor.....	8.50	8.30	2
Peruvian Guano Ex Coya.....	9	9	2
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	49

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—</i>			
Crown Ammoniated Guano.....	8	2	1.50
Comet Guano	8	2	1
Planters' Pride	8	2.50	3
Eli Ammoniated Guano.....	8	2	2
Eclipse Ammoniated Guano.....	8	2.50	2
Horne's Best	8	3	3
Caraleigh Special Tobacco Grower.....	8	2.50	3
Dandy Acid Phosphate.....	10	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Climax Dissolved Bone.....	14	..	..
Staple Acid Phosphate.....	12	..	..
Sterling High Grade Acid Phosphate.....	13	..	..
Electric Bone and Potash.....	10	..	2
Horne & Son's High Grade Bone and Potash....	11	..	5
Morris & Scarboro's Special Bone and Potash Mix- ture	10	..	3
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Pacific Tobacco and Cotton Grower.....	9	2.75	2
<i>W. H. Camp, Petersburg, Va.—</i>			
Camp's Prepared Chemicals No. 1.....	8	3.50	7.50
Camp's Prepared Chemicals No. 3.....	8	2.75	2
Camp's Prepared Chemicals for Irish Potatoes....	7	7.50	10
Camp's Bone and Potash.....	10	..	4
Camp's Special for Tobacco.....	8	3	3
<i>Crow Fertilizer Co., Monroe, N. C.—</i>			
Crow's Union County Special.....	8	2	2
Crow's H. G. Blood and Fish.....	8	3	3
Crow's 14 Per Cent Acid Phosphate.....	14	..	..
Crow's Kainit .....	..	..	12
<i>Dixie Guano Co., Durham, N. C.—</i>			
Niagara Soluble Bone.....	8	2.50	2
Battle's Blood and Bone.....	8	2.50	3
Dixie Champion for Wheat and Corn.....	10	..	1.50
Dixie Star Ammoniated 8-2-1.....	8	2	1
Jeff Davis Special.....	9	2.75	2
Carolina Special Ammoniated.....	8	3	3
Radium	8	4	5
Sulky Plow Brand.....	8	3	2
Old Plantation Superphosphate.....	8	2	2
<i>Etiwan Fertilizer Co., Charleston, S. C.—</i>			
Plow Brand Ammoniated Dissolved Bone.....	8.65	2	2
Plow Brand Raw Bone Superphosphate.....	8	2.50	1
Plow Brand Special Tobacco Fertilizer.....	8	4	4
Plow Brand Acid Phosphate with Potash.....	11	..	1
Plow Brand Ammoniated Fertilizer.....	8	2	2
Etiwan Soluble Bone with Potash.....	10	..	3
Etiwan Cotton Compound.....	8	3	3
Etiwan Ammoniated Fertilizer.....	8	2	2
Etiwan Superior Cotton Fertilizer.....	8	4	6
Etiwan High Grade Acid Phosphate.....	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Etiwan Dissolved Bone.....	13	..	..
Etiwan Ammoniated Dissolved Bone.....	8.65	2	2
Etiwan Potash Bone.....	10	..	4
Etiwan Special Potash Mixture.....	8	..	4
Etiwan Acid Phosphate with Potash.....	11	..	1
Etiwan High Grade Cotton Fertilizer.....	8	3	2
Etiwan Blood and Bone Guano.....	8	2.50	1
Diamond Soluble Bone.....	13	..	..
Diamond Soluble Bone with Potash.....	10	..	2
XX Acid Phosphate with Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
<i>Eureka Fertilizer Co., Perryville, Md.—</i>			
Potato Special	8	2.50	3
Camden Special	6	5	7
Alkaline Bone and Potash.....	10	..	2
Farmers' Favorite Bone Phosphate.....	8	2	2
Seven Per Cent Trucker.....	7	7	7
5 Per Cent Alkaline Bone and Potash.....	12	..	5
<i>Fairforest Oil Mill, Fairforest, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Fremont Oil Mill Co., Fremont, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Farmers Cotton Oil Co., Wilson, N. C.—</i>			
Dean's Special Guano.....	8	4.50	7
Golden Gem Guano.....	8	3	3
Planter's Friend Guano.....	8	2.50	3
Carolina Choice Tobacco Guano.....	8	2.50	3
Wilson High Grade Guano.....	8	2.75	2
Farmer's Special Guano.....	8	2	2
Crop King Guano.....	8	2	2
XTra Good Bone and Potash.....	10	..	2
Regal Acid Phosphate.....	12	..	..
Contentnea Acid Phosphate.....	13	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Bonum Acid Phosphate.....	14	..	..
J. D. Farrior's Special Guano for Cotton and Tobacco	8	3	3
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Cotton-seed Meal .....	..	7.50	..
Cotton-seed Meal .....	..	8	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Perfect Top Dresser for all Crops.....	2	10	5
<i>Farmers Guano Co., Raleigh, N. C.—</i>			
State Standard Guano.....	8	2	2
Toco Tobacco Guano.....	8	2.50	3
Big Crop Guano.....	8	2.50	3
Golden Grade Guano.....	8	3	3
Century Bone and Potash Mixture.....	10	..	2
Farmers' High Grade Acid Phosphate.....	13	..	..
16 Per Cent Acid Phosphate.....	16	..	..
14 Per Cent Acid Phosphate.....	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>W. S. Farmer & Co., Baltimore, Md.—</i>			
Dissolved South Carolina Bone.....	14	..	..
Fish Mixture	8	2	2
Kainit .....	..	..	12
Anne Arundel Trucker.....	7	4.50	8
Top Dresser	5	5	5
Hawkeye	8	3	3
Clyde Brand	8	2	1
Truckers' Compound	8	3	4
Tampico	7	5	5
Strawberry Mixture	9	5	5
W. S. Farmer & Co.'s Standard Phosphate.....	10	2.50	2.50

Griffith & Boyd, Baltimore, Md.—

Accomac Trucker.....	6	5	7
Spring Crop Grower.....	6.50	2	4.50
Nitro Crop Feeder.....	9	2.50	..
Double Strength Tobacco Grower.....	8	3	3
Vegetable Bone	8	3	7
7 Per Cent Guano.....	5	7	5
Stable Manure Substitute.....	5	3.50	4
Ammoniated Bone Phosphate.....	8	2	2
High Grade Acid Phosphate.....	12	..	..
Genuine German Kainit.....	..	..	12

*The Home Fertilizer Chemical Works,
Baltimore, Md.—*

Boykin's Home Potato Grower.....	6	4	4
Cerealite Top Dressing.....	..	9	2.50
Boykin's Vegetable Fertilizer.....	6	5	6
Phoenix Crop Grower.....	8	3	2
Boykin's Cereal Fertilizer.....	8	2	2
Boykin's Dissolved Animal Bone.....	12	2	..
Yancey's Formula for Yellow Leaf Tobacco.....	8	3	2
Boykin's Alkaline Bone.....	10	..	2
Boykin's High Grade Acid Phosphate.....	14	..	..
Home Fertilizer .....	..	7	7
Boykin's Royal Potato Fertilizer.....	6	7	5
German Kainit .....	..	..	12
Nitrate of Soda .....	..	19	..
Muriate of Potash .....	..	..	50
Sulphate Ammonia .....	..	25	..
Boykin's Excelsior Acid Phosphate.....	16	..	..

Hardison Co., Wadesboro, N. C.—

Genuine German Kainit.....	..	..	12
Nitrate of Soda .....	..	18	..

S. B. Harrell & Co., Norfolk, Va.—

Harrell's Truck Guano.....	6	7	5
Harrell's Champion Cotton and Peanut Grower..	8	2	2
Harrell's Acid Phosphate.....	14	..	..

Hadley, Harris & Co., Wilson, N. C.—

Hadley's Boss Guano.....	8	2.75	2.50
John Hadley's Special H. G. Plant Food.....	8	2	2
Daisy Guano	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Hall & Pearsall, Wilmington, N. C.—</i>			
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
<i>The Hampton Guano Co., Norfolk, Va.—</i>			
Dauntless Potash Mixture.....	10	..	2
Supreme Acid Phosphate 16 Per Cent.....	16	..	..
Hampton Crop Grower.....	10	..	4
Hampton Bone and Potash Mixture.....	11	..	2
Hampton Acid Phosphate.....	14	..	..
Hampton Ammoniated Superphosphate.....	8	2	1
Alpha Crop Grower.....	8.50	2.50	2.50
Shirley Superphosphate.....	8	2	2
Arlington Animal Bone Fertilizer.....	9	2.25	4
Little's Favorite Crop Grower.....	7	4	4
P. P. P. Princess Prolific Producer.....	8	3	3
Reliance Truck Guano.....	7	5	5
Virginia Truck Grower.....	6	7	5
Hampton Tobacco Guano.....	8	3	3
Hampton Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
<i>The Hubbard Fertilizer Co., Baltimore, Md.—</i>			
Hubbard's 'Trucker's 7 Per Cent Royal Seal Com- pound.....	6	7	5
Hubbard's 'Trucker's 10 Per Cent Guano.....	4	10	4
Hubbard's Jersey Trucker.....	8	2	10
Hubbard's 5 Per Cent Truck Guano.....	6	5	5
Hubbard's Yellow Wrapper Guano.....	8	3	3
Hubbard's Standard Bone Superphosphate.....	8	2	3
Hubbard's Soluble Bone and Potash.....	10	..	2
Hubbard's Royal Ensign.....	8	3	4
Hubbard's Exchange Guano.....	8	2	2
Hubbard's Special Mixture of Bone and Potash...	10	..	4
Hubbard's H. G. Soluble Tennessee Phosphate...	14	..	..
German Kainit.....	..	..	12
Lang's Favorite.....	8	2.50	3
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial X. L. O. for Cotton.....	8	3	3
Imperial Tobacco Guano.....	8	3	3
Imperial Cubanola Tobacco Guano.....	4	3	5
Imperial Champion Guano.....	8	2	2
Imperial Peanut and Corn Guano.....	8	2	2
Imperial Cisco Soluble Guano.....	8	2	2
Imperial 10 Per Cent Guano.....	5	10	2.50
Imperial Standard Premium Guano.....	8	2	1.50
Imperial 5-6-7 Potato.....	6	5	7
Imperial Special 7 Per Cent for Potatoes and Early Truck.....	5	7	5
Imperial Laughinghouse Special Tobacco Guano..	4	4	6
Imperial Cotton Grower.....	8	2	1.50
Imperial Martin County Special Guano.....	9	2.75	2
Imperial High Grade Irish Potato.....	7	5	8
Imperial Williams' Special Potato.....	6	5	5
Imperial Fish and Bone Guano.....	6	4	4
Imperial H. G. Acid Phosphate.....	14	..	..
Imperial H. G. Tennessee Acid Phosphate.....	16	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Imperial Guano for Bright Tobacco.....	8	2.50	3
Imperial Bone and Potash.....	10	..	2
Imperial German Kainit .....	..	..	12
Asparagus Mixture .....	..	6.50	7
Imperial Great Grain Grower for Wheat, Corn and Oats	10	..	3
Imperial General Crop Grower.....	8	2	1
Imperial Best Bone and Potash.....	10	..	4
Imperial 13 Per Cent Acid Phosphate.....	13	..	..
<i>Jonesville Oil Mill, Jonesville, S. C.—</i>			
Cotton-seed Meal .....	..	8	..
<i>Ketcham Fish and Fertilizer Co., Manteo, N. C.—</i>			
Ketcham's Fish Extract for Potatoes.....	5	4	5
Ketcham's Standard Corn Grower.....	5	6	3
<i>Lister's Agricultural Chemical Works, Newark, N. J.—</i>			
Lister's Standard Bone Superphosphate of Lime..	9	2	2
Lister's Ammoniated Dissolved Bone Fertilizer...	8	2.50	2
Lister's Success Fertilizer.....	8	2	2
<i>Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Louisburg Cotton Oil Co., Louisburg, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Laurinburg Oil Co., Laurinburg, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>A. S. Lee & Sons Co., Richmond, Va.—</i>			
Lee's High Grade Bone and Potash.....	9	..	4
Lee's Special Wheat Fertilizer.....	8	..	2
Lee's Prepared Agricultural Lime.....	..	..	2
Lee's German Fruit Grower.....	4	3	6
Lee's Plant Bed Fertilizer.....	8	2	2
Lee's Special Corn Fertilizer.....	8	..	2
Lee's Rice Grower	8	..	3
Imported Thomas' Basic Slag.....	16	..	..
<i>E. H. & J. A. Meadows Co., New Bern, N. C.—</i>			
Meadows' Diamond Acid Phosphate.....	14	..	..
Meadows' Great Cabbage Guano.....	7	7	7
Meadows' All Crop Guano.....	8	2.50	2.50
Meadows' Great Potato Guano.....	7	5	8
Meadows' Labos Guano	8	5	5
Meadows' Cotton Guano	8	2	2
Meadows' 10 Per Cent Ammoniated Guano.....	6	10	2.50
Meadows' Sea Bird Guano.....	9	4	2.50
Meadows' Roanoke Guano.....	8	2.50	3
Meadows' Gold Leaf Tobacco Guano.....	8	3	3
Meadows' Genuine German Kainit.....	..	..	12
Dixon's Cotton Guano	8	2	2
Dixon's High Grade Tobacco Guano.....	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The D. B. Martin Co., Philadelphia, Pa.—</i>			
Martin's Claremont Vegetable Grower.....	7	3	5
Martin's Bull Head Fertilizer.....	8	3	3
Martin's Carolina Cotton Fertilizer.....	8	2	2
Martin's Early Truck and Vegetable Grower.....	6	4	8
Pure Dissolved Bone.....	12	2	..
Martin's Pure Ground Bone.....	22.90	2	..
Martin's Pure Raw Bone Meal..... (Total)	21.00	4.50	..
Martin's High Grade Kainit.....	..	..	12
Martin's Acid Phosphate.....	14	..	..
Martin's Potash and Soluble Bone.....	12	..	3
Potash and Soluble Bone.....	12	..	5
Potash and Soluble Bone.....	10	..	4
Potash and Soluble Bone.....	10	..	2
Acid Phosphate.....	13	..	..
<i>Thos. Meehan & Sons, Germantown, Philadelphia, Pa.—</i>			
Meehan's Canada Hardwood Ashes.....	..	5.32	..
Meehan's Bone Meal..... (Total)	20.93	3.50	..
<i>The Miller Fertilizer Co., Baltimore, Md.—</i>			
Special Tobacco Grower.....	8	2	4
Standard Phosphate.....	8	3	3
Miller's Irish Potato.....	8	4	4
Ammoniated Dissolved Bone.....	8	2	2
High Grade Potato.....	6	5	7
Tobacco King.....	8	3	3
Standard Potato.....	8	2	2
Potato and Vegetable Grower.....	8	2	4
Cotton Queen.....	8	2	1
Trucker.....	8	5	5
S. C. Rock.....	14	..	..
Grain and Grass Grower.....	8	2	1
Profit.....	8	2	2
Potash Mixture.....	10	..	4
Farmer's Profit.....	8	2	2
Corn and Peanut Grower.....	10.50	..	2.25
Harmony.....	8	2.50	3
Clinch.....	10	..	2
Kainit.....	..	..	12
Miller's 7 Per Cent.....	7	7	7
Miller's 16 Per Cent Acid Phosphate.....	16	..	..
Four Per Cent Tobacco.....	8	4	4
No. 1 Potato and Vegetable Grower.....	8	4.50	7
<i>Marsh-Lee Co., Marshville, N. C.—</i>			
Marsh's Special High Grade for all Crops.....	8	3	3
Marsh's Guano for Corn.....	8	2	2
Marsh's Cotton Fertilizer.....	8	2	2
<i>The Mapes Formula and Peruvian Guano Co., New York.—</i>			
The Mapes Corn Manure.....	8	3	6
The Mapes Economic Potato Manure.....	4	4	8
The Mapes Complete Manure "A" Brand.....	10	3	2.50
The Mapes Soluble Potato Manure.....	2	7	5
The Mapes Vegetable Manure or Complete Manure for Light Soils.....	6	6	6

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The MacMurphy Co., Charleston, S. C.—</i>			
Special 9-3-3 Guano.....	9	3	3
Special 8-5-7 Guano.....	8	5	7
Special 8-3-3 Cotton and Corn Guano.....	8	3	3
Standard 8-2½-1 Cotton Guano.....	8	2.50	1
Doubly Ammoniated Truck Farmers' Special Guano	8	8	4
Truck Farmers' Special Guano.....	10	4	4
Special 8-4-4 Tobacco Guano.....	8	4	4
Truckers' Special 6-5-6 Vegetable Guano.....	6	5	6
Wilcox, Gibbs & Co.'s Manipulated Guano.....	9	2.75	2
Special 8-2-2 Cotton and Corn Guano.....	8	2	2
Special 8-3-3 Tobacco Guano.....	8	3	3
Truckers' Special Potato Guano.....	7	4	5
High Grade Acid Phosphate.....	13	..	..
Acid Phosphate and Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	18	..
Sulphate of Potash.....	..	..	48
Muriate of Potash.....	..	..	48
<i>N. C. Cotton Oil Co., Charlotte, N. C.—</i>			
Majestic	8	2	2
<i>North Carolina Cotton Oil Co., Henderson, N. C.—</i>			
Pride of Vance Tobacco Fertilizer.....	9	3	3
Vance Cotton Grower.....	8	2	2
Franklin Cotton Grower.....	8	2	2
Henderson Cotton Fertilizer.....	8	2	2
Franklin Tobacco Fertilizer.....	9	3	3
Henderson Tobacco Fertilizer.....	9	3	3
Unedit Tobacco Fertilizer.....	9	3	3
<i>North Carolina Cotton Oil Co., Wilmington, N. C.—</i>			
Wilmington Special	8	2	2
Carter's Lifter	8	3	3
<i>North Carolina Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8	2.75	2
<i>Norfolk Fertilizer Co., Norfolk, Va.—</i>			
High Grade Acid Phosphate.....	14	..	..
Oriana Cotton Grower.....	8	2	2
Genuine German Kainit .....	..	..	12
C. S. M. Special Crop Grower.....	9	2.75	2
8-3-3 Cotton Grower.....	8	3	3
Tobacco Grower	8	3	3
Bone Potash	10	..	2
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
Pamlico Electric Top Dresser.....	5	10	2.50
Dunn's Standard Truck Grower.....	7	7	7
Ives' Irish Potato Guano.....	7	5	7
Lenoir Bright Leaf Tobacco Grower.....	8	3	3
Craven Bright Tobacco Guano.....	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Craven Cotton Guano	8	2	2
Pitt's Prolific Golden Tobacco Guano.....	8	3	3
Foy's High Grade Fertilizer.....	8	3	3
Onslow Farmers' Reliance Guano.....	8	2.50	3
Jones County Premium Crop Grower.....	8	2.50	3
Greene County Standard Fertilizer.....	8	2	2
Carteret Bone and Potash.....	10	..	2
Fourteen Per Cent Acid Phosphate.....	14	..	..
Genuine German Kainit .....	..	..	12

Navassa Guano Co., Wilmington, N. C.—

Ammoniated Soluble Navassa Guano.....	8	2.50	2
Clarendon Tobacco Guano	8	3	3
Navassa High Grade Guano.....	8	3	3
Occoneechee Tobacco Guano	8	2	2
Coree Tobacco Guano	8	4	4
Harvest King Guano.....	8	2	3
Navassa Complete Fertilizer.....	8	2	1
Navassa Cotton Grower.....	8	2	2
Navassa Cotton-seed Meal Guano.....	8	2	2
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8	3	2
Navassa Fruit Growers' Fertilizer.....	8	2	6
Navassa Grain Fertilizer.....	8	2	2
Navassa Guano for Tobacco.....	8	2.50	2
Navassa Carib Guano.....	8	3	10
Navassa Root Crop Fertilizer.....	7	5	7
Navassa Creole Guano.....	6	5	7
Navassa Special Truck Guano.....	8	4	4
Navassa Blood and Meal Mixture.....	8	3	5
Navassa Strawberry Top Dressing.....	8	2.50	4
Navassa Universal Fertilizer.....	8	2	1
Navassa 16 Per Cent Acid Phosphate.....	16	..	..
Navassa 14 Per Cent Acid Phosphate.....	14	..	..
Navassa High Grade Dissolved Bone.....	13	..	..
Navassa Acid Phosphate.....	12	..	..
Croatan Acid Phosphate	10	..	..
Harvey's Bone and Potash Mixture.....	8	..	3
Navassa Acid Phosphate with Potash.....	10	..	1
Navassa Bone and Potash.....	8.50	..	2
Navassa Dissolved Bone with Potash.....	10	..	2
Navassa Gray Land Mixture.....	12	..	4
Navassa Special Wheat Mixture.....	12	..	4
Navassa Wheat and Grass Grower.....	10	..	4
Navassa Wheat Mixture.....	10	..	2.25
Navassa Worlick's Mixture.....	8	..	2.25
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
Cotton-seed Meal .....	..	7.50	..
Nitrate of Soda.....	..	19	..

G. Ober & Sons Co., Baltimore, Md.—

Ober's Dissolved Bone Phosphate.....	14	..	..
Ober's Dissolved Bone Phosphate and Potash....	10	..	2
Ober's Acid Phosphate with Potash.....	8	..	4
Ober's Complete Fertilizer.....	6	5	6
Ober's Special Compound for Tobacco.....	8	3	3
Ober's Standard Tobacco Fertilizer.....	8	2	2
Ober's Special High Grade Fertilizer.....	9	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Ober's Special Ammoniated Dissolved Bone.....	9	2	2
Ober's Special Cotton Compound.....	8	2	2
Kainit .....	..	..	12
Muriate of Potash .....	..	..	48
Nitrate of Soda .....	..	18	..
Cooper's Pungo Guano.....	8	2.50	2

Powhatan Chemical Co., Richmond, Va.—

Powhatan Trucker	7	6	5
North State Special.....	8	4	4
P. C. Co.'s Hustler.....	8	3	3
Economic Cotton Grower	9	2.75	2
White's Leaf Tobacco Grower.....	8	2.50	3
King Brand Fertilizer.....	8	2.50	3
Magic Tobacco Grower	8	2	2
Magic Special Fertilizer	8	2	2
Magic Cotton Grower.....	8	2	2
Magic Guano Mixture.....	8	2	1
Guilford Special Tobacco Fertilizer.....	9	3	6
Magic Bone and Potash Mixture.....	10	..	4
Powhatan Bone and Potash Mixture.....	8	..	4
Magic Grain and Grass Grower.....	8	..	4
Magic Peanut Grower	8	..	4
Magic Bone and Potash.....	10	..	2
Dixie Grain and Grass Grower.....	8	..	2
Magic Dissolved Bone Phosphate.....	16	..	..
Uneeda Acid Phosphate.....	15	..	..
High Grade Acid Phosphate.....	14	..	..
Powhatan Acid Phosphate	13	..	..
Virginia Dissolved Bone.....	12	..	..
Magic S. C. Phosphate.....	10	..	..
Pure Raw Bone Meal..... (Total)	20	4	..
Bone Meal	25	3	..
Pure German Kainit .....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..

Pacific Guano Co., Boston, Mass., Charleston, S. C.—

Soluble Pacific Guano	8.50	2	2
Pacific Special High Grade Fertilizer.....	8	3	3
Pacific Acid Phosphate	12

Pinetop Supply Co., Pinetop, N. C.—

Pinetop Standard	8	2	2
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The Pocomoke Guano Co., Norfolk, Va.—

Superb Acid Phosphate 16 Per Cent.....	16
Pamlico Superphosphate	8	2	2
Peerless Acid Phosphate	14	..	..
Electric Crop Grower	8.50	2	2
Pocomoke Superphosphate	8.50	2	2
Hornthal Tobacco Guano.....	8	2	2
L. P. H. Premium.....	8	2	2
Crescent Complete Compound	8	2	2
Cinco Tobacco Guano	8.50	2.50	2.50
Monarch Tobacco Grower	8	3	3
Monticello Animal Bone Fertilizer.....	9	2.25	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Harvey's High Grade Monarch.....	8	3	3
Faultless Ammoniated Superphosphate.....	7	4	4
Seaboard Popular Trucker	6	7	5
Standard Truck Guano.....	7	5	5
Freeman's 7 Per Cent Irish Potato Grower.....	6	7	5
Coast Line	5	10	3
Pocomoke Bone and Potash Mixture.....	10	..	4
10-2 Potash Mixture.....	10	..	2
Alkali Bone	11	..	2
Genuine German Kainit .....	..	..	12
Pure Ground Bone.....(Total)	20	4.50	..
Nitrate of Soda .....	..	19	..
Muriate of Potash.....	..	..	50

Pocahontas Guano Co., Lynchburg, Va.—

Carrington's Superior Grain Compound.....	10	..	2
Carrington's Banner Brand Guano.....	8	2	2
Carrington's No. 3 Grain Grower.....	10	..	3
Carrington's S. C. Phosphate (Waukeshaw Brand), Pocahontas Special Tobacco Fertilizer.....	16	..	..
High Grade 4 Per Cent Tobacco Compound (Mo- hawk King)	9	3	3
Yellow Tobacco Special.....	9	2.25	4
Standard Tobacco Guano (Old Chief Brand).....	9	2	2
Farmers' Favorite Guano (Apex Brand).....	8	3	3
Grain Special Bone and Potash New Rival Brand)	10	..	1.65
Imperial Dissolved S. C. Phosphate.....	14	..	..
Red Bear Special	8	2.50	3
Black Hawk Brand	8	2.50	2
Big Joe Brand	8	2	1
Wabash Wheat Mixture	10	..	4
Cherokee Grain Special.....	8	..	4
Pure Raw Bone Meal.....(Total)	22	4.50	..
Swann Cotton Grower	9	2	2
Spot Cash Tobacco Compound.....	8	2.50	3
Indian Truck Grower.....	8	4	4

Patapsco Guano Co., Baltimore, Md.—

Patapsco Special Tobacco Mixture.....	8	2.50	3
Patapsco Guano	9.25	2.50	2
Patapsco Guano for Tobacco.....	9.25	2.50	2
Patapsco Tobacco Guano.....	9	3	3
Patapsco Trucker for Early Vegetables.....	7	5	5
Patapsco Crop Dresser.....	4	4	4
Patapsco Potato Guano	6	5	7
Patapsco 7-7-7 Truck Guano.....	7	7	7
Patapsco 10-4 Potash Mixture.....	10	..	4
Patapsco High Grade Bone and Potash.....	11	..	5
Patapsco Soluble Bone and Potash.....	10	..	2
Patapsco Dissolved S. C. Phosphate.....	14	..	..
Patapsco Money Maker Guano.....	7	4.50	6
Florida Soluble Phosphate.....	16	..	..
Planters' Favorite	8	2	2
Choctaw Guano	8	3	3
Unicorn Guano	8	2.50	3
Baltimore Soluble Phosphate.....	11	..	2
Sea Gull Ammoniated Guano.....	8	2	2
Pilot Guano Special 4 Per Cent.....	10	2.50	4
Genuine German Kainit.....	..	..	12

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	50
Fine Ground Bone..... (Total)	20.61	4	..
Dried Blood	13.44	..
Ground Fish	11	..

Piedmont-Mt. Airy Guano Co., Baltimore, Md.—

Piedmont Potato Producer.....	5	3	6
Piedmont Special Truck Fertilizer.....	6	7	5
Piedmont Cultivator Brand.....	8	2	2
Piedmont Farmers' Standard	9	2	2
Piedmont Essential Tobacco Compound.....	9	2	2
Piedmont High Grade S. C. Phosphate.....	14	..	..
Piedmont High Grade Ammoniated Bone and Potash.....	8	3	3
Piedmont Special for Cotton, Corn and Peanuts...	8	2	2
Piedmont Special Farmers' Tobacco Guano.....	8.40	3	4
Piedmont Guano for Tobacco.....	8	2.50	3
Piedmont Farmers' High Grade Bone and Potash.	10	..	2
Piedmont Bone and Peruvian Mixture.....	8	2	2
Piedmont Soluble Bone and Potash.....	8	..	2
Piedmont Guano for Cotton.....	8	2	1
Piedmont Early Vegetable Manure.....	6	5	7
Piedmont Special Potash Mixture.....	10	..	5
Levering's Reliable Tobacco Guano.....	8	3	3
Levering's Potashed Bone.....	10	..	4
Genuine German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	18.50	..
Privott's Standard Guano.....	8	2.50	3
High Grade Acid Phosphate.....	14	..	..
Wood's 4 Per Cent Acid Phosphate.....	14	..	..
Wood's Potato Guano.....	6	5	7
Wood's Cotton Grower.....	8	2	2
Wood's Corn Fertilizer.....	10	..	2
Piedmont Guano for all crops.....	8	2.50	3
Piedmont Fish Guano.....	8	2	2
Piedmont High Grade Truck Fertilizer.....	6	4	6
Privott's Special for Potato and Vegetables.....	8	2	6
Privott's 3-8-4 Guano.....	8	3	4

The Quinnpiaic Co., New York, Charleston, S. C.—

Quinnpiaic Pine Island Ammoniated Superphosphate.....	9	2.25	1
Quinnpiaic Acid Phosphate.....	13	..	..

F. S. Royster Guano Co., Norfolk, Barbours, Columbia, and Macon, Ga.—

Farmers' Bone Fertilizer.....	8	2	2
Marlborough H. G. Cotton Grower.....	8	3	3
Special Compound.....	8	2	1
Caledonia Compound.....	8	2	1
Arrow Brand Guano.....	8	2.50	1
Royster's Meal Mixture.....	9	2.75	2
Bonanza Tobacco Guano	8	3	3
Orinoco Tobacco Guano.....	8	2.50	3
Special Tobacco Compound.....	8	2.50	2
Cobb's High Grade for Tobacco.....	8	5	6
Williams' Tobacco Guano.....	6	3	6

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Royster's Special 10 Per Cent Truck Guano.....	5	10	3
Royster's Early Truck Guano.....	7	5	8
Royster's Special 7 Per Cent Truck Guano.....	7	7	7
Trucker's Delight	8	4	4
Royal Potato Guano.....	7	5	5
Ballentine's Potato Guano	6	7	7
Royal Special Potato Guano.....	7	5	7
Royster's Special Sweet Potato Guano.....	8	3	3
Royster's Special 8-4-3.....	8	4	3
Royster's Special Wheat Fertilizer.....	8	2	2
Tomlinson's Special	9	3	5
Royster's Peanut Special.....	7	..	5
Royster's Bone and Potash.....	10	..	2
Royster's 10 and 4 Bone and Potash Mixture....	10	..	4
Royster's 8 and 2 Bone and Potash Mixture.....	8	..	2
Royster's 8 and 4 Bone and Potash Mixture.....	8	..	4
Royster's Bone and Potash for Grain.....	10	..	3
Royster's II. G. 16 Per Cent Acid Phosphate....	16	..	..
Royster's 14 Per Cent Acid Phosphate.....	14	..	..
Royster's H. G. Dissolved Bone.....	13	..	..
Royster's XX Acid Phosphate.....	12	..	..
Magic Top Dressing.....	..	9	2.50
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	48
Royster's Special	8	4	3
Royster's 8 and 2.25 Bone and Potash Mixture....	8	..	2.25
Royster's Best Guano.....	8	4	7
Harvey's Cabbage Guano.....	5	8	3
Royster's Complete Fertilizer.....	8	2	2
Humphries' Special for Tobacco.....	6	3.10	3.20

Read Phosphate Co., Charleston, S. C.—

Read's High Grade Acid Phosphate.....	13
Read's High Grade Cotton Grower.....	8	3	3
Read's High Grade Manipulated Guano.....	9	2	3
Read's Soluble Fish Guano.....	8	2	2
Read's Cotton Flower.....	8	2.50	1
Read's High Grade Tobacco Leaf.....	8	3	3
Read's Alkaline Bone	10	..	2
Read's Special Potash Mixture.....	8	..	4
Read's High Grade Dissolved Bone.....	14	..	..
Read's Bone and Potash.....	10	..	4
Genuine German Kainit.....	..	..	12

J. H. Roberson & Co., Robersonville, N. C.—

Roberson's Potato Grower.....	6	7	5
Roberson's Cotton Grower.....	9	2.75	2
Roberson's High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
Roberson's Bright Leaf Grower.....	8	2.50	3

Richmond Guano Co., Richmond, Va.—

10 Per Cent Cabbage Guano.....	6	10	2
Special High Grade for Truck.....	7	6	5
Southern Trucker	8	5	5
Perfection Special	8	4	4

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Am- monia.	Potash.
Gilt Edge Fertilizer.....	8	3	3
Carolina Cotton Grower.....	9	2.75	2
Carolina Bright Special Tobacco Fertilizer.....	8	2.75	2.50
Tip Top Fertilizer.....	8	2.50	3
Special Premium Brand for Tobacco.....	8	2.25	2.25
Special Premium Brand for Plants.....	8	2.25	2.25
Carolina Bright for Cotton.....	8	2.50	1.50
Premium Tobacco Fertilizer.....	8	2	2
Premium Brand Fertilizer.....	8	2	2
Edgecombe Cotton Grower	8	2	2
Bone Mixture	8	2	1
Clark's Special Formula.....	7	6	6
Carte's Special Tobacco Fertilizer.....	4	3	6
Saunders' Special Formula for Bright Tobacco....	9	3.50	5
Burton's Special Tobacco Fertilizer.....	9	2.50	3
Premium Bone and Potash Mixture.....	13	..	3
Rex Bone and Potash Mixture.....	10	..	4
Tip Top Bone and Potash Mixture.....	8	..	4
Winter Grain and Grass Grower.....	8	..	4
Premium Peanut Grower.....	8	..	4
Bone and Potash Mixture.....	10	..	2
Premium Grain and Grass Grower.....	8	..	2
Rex Dissolved Bone Phosphate.....	16	..	..
High Grade Acid Phosphate.....	14	..	..
High Grade Wheat and Grass Fertilizer.....	14	..	..
Premium Dissolved Bone.....	13	..	..
Dissolved S. C. Phosphate.....	12	..	..
Old Homestead Dissolved Bone.....	10	..	..
Hunter & Dunn's Dissolved Bone.....	13	..	..
Hunter & Dunn's Special Ammoniated Fertilizer..	9	3	2.25
Hunter & Dunn's Ammoniated Fertilizer.....	8	2	2
Pure Raw Bone Meal..... (Total)	20	4	..
Bone Meal	25	3	..
Pure German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
Sulphate of Ammonia.....	..	24	..
Nitrate of Soda .....	..	19	..
<i>Red Springs Trading Co., Red Springs, N. C.—</i>			
Kainit .....	..	..	12
<i>Reidsville Fertilizer Co., Reidsville, N. C.—</i>			
Lion Brand Fertilizer.....	9	3	6
Champion Guano	8	2	2
Royal Fertilizer	8	3	3
Banner Fertilizer	8	2	1
Broad Leaf Tobacco Guano.....	8	2.25	2.50
Bone and Potash 10-4.....	10	..	4
Bone and Potash 8-2.....	8	..	2
<i>Rasin Monumental Co., Baltimore, Md.—</i>			
Rasin Acid Phosphate.....	14	..	..
Rasin Bone and Potash.....	10	..	2
Rasin Special Bone and Potash.....	10	..	5
Rasin Empire Guano.....	8	2	2
Rasin Dixie Guano.....	8	2	1
Rasin Gold Standard Guano.....	8	3	3
Rasin 13 Per Cent Acid Phosphate.....	13	..	..
Rasin 16 Per Cent Acid Phosphate.....	16	..	..
Rasin Acid Phosphate	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Red Springs Oil and Fertilizer Co., Red Springs, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Rocky Mount Guano Co., Rocky Mount, N. C.—</i>			
Tar River Special.....	8	2.50	3
Royal Cotton Grower.....	9	2.75	2
Eagle Guano	8	2	2
<i>Rowland Oil and Fertilizer Co., Rowland, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Oliver Smith Co., Wilmington, N. C.—</i>			
Genuine Peruvian Guano Ex. S. S. Hanseat (Total)	23	3.60	4.25
Genuine Peruvian Guano Ex. P. O. Condor (Total)	9	8.30	2
Nitrate of Soda.....	..	18	..
Genuine German Kainit.....	..	..	12
<i>Southern Cotton Oil Co., Rocky Mount, Charlotte, Fayetteville, Wilson, Tarboro, Monroe, Gastonia, Davidson, Shelby, Goldsboro, Concord, Gibson, Conetoc, N. C., Union, S. C., Spartanburg, S. C., Columbia, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Southern Exchange Co., Maxton, N. C.—</i>			
Two-Four Guano.....	7	4	4
That Big Stick Guano.....	8	3	4
Bull of the Woods Fertilizer.....	8	3	4
Jack's Best Fertilizer.....	8	3	3
Correct Cotton Compound.....	8	3	3
R. M. C. Special Crop Grower.....	8	3	3
Juicy Fruit Fertilizer.....	9	2.25	4
The Walnut Fertilizer.....	8.50	2.50	2.50
The Racer Guano.....	8	2	3
The Coon Guano.....	8	2	2
McKimmon's Special Truck Formula.....	8	5	7
Melon Grower	8	5	7
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	19	..
<i>The Southern Cotton Oil Co., Charlotte, Concord, David- son, Gastonia, Monroe, Shelby, N. C.—</i>			
Conqueror	8	4	4
Moon	8	3	3
Red Bull	8	2.50	2
King Bee	8.65	2	2
Magnolia	8.65	2	2
Gloria	8	2	2
First Call	8	2.50	1
Sun Rise	8	2.50	1
Gold Seal	14	..	..
Silver King	13	..	..
Genuine German Kainit.....	..	..	12
<i>Goldsboro, N. C.—</i>			
Best & Thompson's Special Cotton Grower.....	9	2.75	2
Goldsboro Oil Mill Special Cotton Grower.....	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Goldsboro Oil Mill High Grade.....	8	2.75	2.50
Goldsboro Oil Mill Standard.....	8	2	2
Southern Cotton Oil Company Standard.....	8	2	2
Southern Cotton Oil Co.'s High Grade.....	8	2.75	2.50
Edgerton's Old Reliable.....	8	3	3
Genuine German Kainit.....	..	..	12
Goldsboro, Rocky Mount, Wilson and Fayetteville. N. C.—			
High Grade Acid Phosphate.....	14	..	..
Peacock	8	3	2
Conqueror Bone and Potash.....	10	..	4
Magnolia Bone and Potash.....	10	..	2
Rocky Mount, N. C.—			
Rocky Mount Oil Mill Standard.....	8	2	2
Rocky Mount Oil Mill High Grade.....	8	2.75	2.50
Rocky Mount Special Cotton Grower.....	8	3	3
Fayetteville, N. C.—			
Fayetteville Oil Mill Standard.....	8	2	2
Fayetteville Oil Mill High Grade.....	8	2.75	2.50
Wilson, N. C.—			
Wilson Oil Mill Standard.....	8	2	2
Wilson Oil Mill Special Cotton Grower..	8	3	3
Wilson Oil Mill High Grade.....	8	2.75	2.50
<i>Swift Fertilizer Works, Atlanta, Ga.—</i>			
Swift's Blood, Bone and Potash H. G. Guano....	9.50	4	7
Swift's Special H. G. Guano.....	9.50	5	3
Swift's Corn and Cotton Grower H. G. Guano....	10	3	3
Swift's Monarch H. G. Guano.....	8	4	4
Swift's Cotton King H. G. Guano.....	9	3	2
Swift's Farmers' Favorite H. G. Guano.....	9	2	3
Swift's Eagle H. G. Guano.....	10	2	2
Swift's Golden Harvest Standard Grade Guano...	8	2	2
Swift's Red Steer Standard Grade Guano.....	8	2	2
Swift's Cotton Plant Standard Grade Guano....	9	2	1
Swift's Special H. G. Phosphate and Potash.....	12	..	6
Swift's Atlanta H. G. Phosphate and Potash.....	12	..	4
Swift's Farmers' Home H. G. Phosphate and Potash	10	..	4
Swift's Plantation Standard Grade Phosphate and Potash	8	..	4
Swift's Wheat Grower Standard Phosphate and Potash	10	..	2
Swift's Field and Farm Standard Grade Phos- phate and Potash.....	10	..	2
Swift's Special H. G. Acid Phosphate.....	16	..	..
Swift's Cultivator H. G. Acid Phosphate.....	14	..	..
Swift's Harrow H. G. Acid Phosphate.....	13	..	..
Swift's Chattanooga Standard Grade Acid Phos- phate	12	..	..
Swift's Pioneer H. G. Tobacco Grower.....	8	2	4
Muriate of Potash.....	..	..	50
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Swift & Company, Chicago, Ill.—</i>			
Swift's Pure Raw Bone Meal.....(Total)	23	4	..
Swift's Pure Bone Meal.....(Total)	25	3	..
Swift's Ground Dried Blood.....	16	..	..
Swift's No. 1 Ground Tankage.....	6	10	..
<i>Spartanburg Fertilizer Co., Spartanburg, S. C.—</i>			
Buenos	8	4	4
Ottora	8	2	1
Tiger Brand Acidulated Phosphate.....	14	..	..
Brown's Compound	10	..	2
Potato Guano	7	3	7
Orpheus	10	..	4
Coronaka	8	2	2
West's Potash Acid.....	13	..	3
Tiger Brand	8	2	6
Boll Buster	9	2	2
Corn Formula	10	2	5
<i>Statesville Oil and Fertilizer Co., Statesville, N. C.—</i>			
Grasoil Ammoniated Guano.....	8	2	2
Redsoil Special Ammoniated Guano.....	9	3	..
Iredell High Grade Acid Phosphate.....	14	..	..
Iredell Bone and Potash.....	10	..	3
Pure German Kainit.....	..	..	12
<i>Tuscarora Fertilizer Co., Baltimore, Md.—</i>			
13 Per Cent Acid Phosphate.....	13	..	..
Acid Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Bone and Potash.....	10	..	2
Alkaline	10	..	5
Standard	8	2	2
Big Four	7	2	2
Fruit and Potash.....	8	2	1
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Cotton Special	8	3	3
Tobacco Special	8	3	3
Manure Substitute	6	4	4
Special Trucker	8	4	4
Tuscarora Trucker	8	5	7
Animal Bone	24	3	..
Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
<i>Tyger-Shoals Milling Co., Wellford, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>R. L. Upshur, Norfolk, Va.—</i>			
Upshur's Peanut Guano	8	2	2
Upshur's High Grade Acid Phosphate.....	14	..	..
Upshur's Fish Bone and Potash.....	8	2	4
Upshur's G. G. and C. Grain, Grass and Cotton Grower.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Premo Cotton Guano.....	8	2	1.50
Upshur's Bone and Potash Guano.....	10	..	..
Upshur's 3-8-3 Cotton Guano.....	8	3	3
Upshur's High Grade Tobacco Guano.....	8	3	3
Upshur's 5 Per Cent Guano.....	5	5	5
Upshur's Special Truck Guano.....	7	5	8
Upshur's 7 Per Cent Potato Guano.....	5	7	5
Upshur's 7 Per Cent Irish Potato Guano.....	6	7	5
Upshur's F. C. Farmers' Challenge Guano.....	6	7	6
Upshur's F. F. Farmers' Favorite Guano.....	7	5	6
Cotton-seed Meal Mixture.....	9	2.75	2
Gemine German Kainit.....	..	..	12

Union Guano Co., Winston, N. C.—

Union Wheat Mixture.....	8	..	4
Union Perfect Cotton Grower.....	9	2.75	2
Union Mule Brand Guano.....	10	2	2
Union Waterfowl Guano.....	8	2.50	3
Union Homestead Guano.....	8	3	3
Union Standard Tobacco.....	8	2.50	2
Union Premium Guano	8	4	4
Union Truck Guano	7	4	5
Union Vegetable Compound.....	7	5	8
Union 16 Per Cent Acid Phosphate.....	16	..	..
Union 10 Per Cent Acid Phosphate.....	10	..	..
Union 12 Per Cent Acid Phosphate.....	12	..	..
Union High Grade Acid Phosphate.....	14	..	..
Union Dissolved Bone	13	..	..
Union 10-5 Bone and Potash.....	10	..	5
Union 10-6 Bone and Potash.....	10	..	6
Union 12-3 Bone and Potash.....	12	..	3
Union 12-4 Bone and Potash.....	12	..	4
Union 12-5 Bone and Potash.....	12	..	5
Union 12-6 Bone and Potash.....	12	..	6
Union Bone and Potash.....	10	..	2
Old Honesty Guano.....	8	2	2
Liberty Bell Crop Grower.....	10	..	1.50
Q. Q. Quality Quantity Guano.....	8	2	1
Victoria High Grade Tobacco Guano.....	8	3	3
Quaker Grain Mixture	10	..	4
Giant Phosphate and Potash.....	10	..	3
Rockingham Bone and Potash.....	8.50	..	2
Genuine German Kainit.....	..	..	12
Vulcan Ammoniated Guano.....	8	2.50	1
Roseboro's Special Potash Mixture.....	12	..	6
Sunrise Soluble Bone and Potash.....	8	..	2.25

Virginia-Carolina Chemical Co., Richmond, Va.—

V. C. C. Co.'s Solid South.....	8	..	2.25
V. C. C. Co.'s 14 Per Cent Acid Phosphate.....	14	..	..
V. C. C. Co.'s 3 Per Cent Special C. S. M. Guano No. 3.....	8	3	2
V. C. C. Co.'s 16 Per Cent Acid Phosphate.....	16	..	..
V. C. C. Co.'s Standard Bone and Potash.....	10	..	5
V. C. C. Co.'s Special Truck Guano.....	6	5	7
V. C. C. Co.'s Formula 44.....	7	3.10	3.20
V. C. C. Co.'s Special Potash Mixture.....	10	..	4
V. C. C. Co.'s Special Crop Grower.....	12	..	3
V. C. C. Co.'s Special.....	8	4	4
V. C. C. Co.'s Invincible High Grade Fertilizer....	6	5	7

Name and Address of Manufacturer and Name of Brand	Avail. Phos. Acid.	Am. monia.	Potash.
V. C. C. Co.'s High Grade Tobacco Fertilizer.....	8	3	0
V. C. C. Co.'s Lion High Grade Tobacco Fertilizer,	8	3	4
V. C. C. Co.'s Great Texas Cotton Grower Soluble Guano.....	9	3	4
Cock's Soluble Guano High Grade Ammoniated Bone.....	9	2.25	3
Adams' Special	8	3	3
Black's Best	8	3	3
Farmers' Favorite Fertilizer, C. S. M.....	8	2	2
Ajax C. S. M.....	8	2	2
Orange Grove	8	2.75	2.50
Royal Crown	8	2.75	2
Atlas Guano C. S. M.....	8	3	2.50
Wilson Standard C. S. M.....	8	2	2
Farmers' Friend Favorite Fertilizer Special.....	8.50	2	2
White Stem C. S. M.....	9	2.75	2
Special High Grade Tobacco Fertilizer C. S. M....	8	3	3
Superlative Guano C. S. M.....	8	2.50	3
Split Silk C. S. M.....	8	3	2.50
Prolific Cotton Grower.....	9	2.75	2
Plant Food	8	2	2
North State Guano C. S. M.....	8	2	1
Good Luck C. S. M.....	8	3	2.50
Blue Star C. S. M.....	8	2.50	3
Delta C. S. M.....	8	2.75	2.50
Diamond Dust C. S. M.....	8	2	2
Admiral	8	3	2.50
Winston Special for Cotton C. S. M.....	8	2	2
Sludge Acid Phosphate.....	14	..	..
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Fish Scrap .....	..	10	..
Sulphate of Potash.....	..	25	..
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	50
Nitrate of Soda.....	..	19	..
V. C. C. Co.'s Southern Cotton Grower.....	9	2.75	2
V. C. C. Co.'s Truck Crop Fertilizer.....	7	5	7
Allison & Addison's Fulton Acid Phosphate.....	14	..	..
Allison & Addison's B. P. Potash Mixture.....	10	..	2
Allison & Addison's Standard Acid Phosphate....	12	..	..
Allison & Addison's I. X. L. Acid Phosphate.....	13	..	..
Allison & Addison's Rockets Acid Phosphate....	10	..	..
Allison & Addison's McGavock's Special Potash Mixture	8	..	2.25
Allison & Addison's Old Hickory Guano.....	8	2	2
Allison & Addison's A. A.....	8	3	3
Allison & Addison's Anchor Brand Fertilizer....	8	2	2
Allison & Addison's Anchor Brand Tobacco Fert..	8.50	2.75	2
Allison & Addison's Star Brand Special Tobacco Manure.....	9	2.75	2
Allison & Addison's Star Brand Guano.....	8	2	1
Allison & Addison's Star Brand Vegetable Guano,	8	4.50	4
Atlantic & Va. Fert. Co.'s Our Acid Phosphate....	12	..	..
Atlantic & Va. Fert. Co.'s Valley of Virginia Phosphate.....	14	..	..
Atlantic & Va. Fert. Co.'s Eureka Acid Phosphate,	10	..	..
Atlantic & Va. Fert. Co.'s Crenshaw's Acid Phos- phate.....	13	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Atlantic & Va. Fert. Co.'s Eureka Bone and Potash Compound	10	..	2
Atlantic & Va. Fert. Co.'s Carolina Truckers'.....	7	7	7
Atlantic & Va. Fert. Co.'s Orient Spl. for Tobacco,	8	2	2
Atlantic & Va. Fert. Co.'s Eureka Ammon'd Bone,	8	2	2
Atlantic & Va. Fert. Co.'s Virginia Truckers'.....	8	5	5
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9	2.50	2
Atlantic & Va. Fert. Co.'s Orient Complete Manure.....	8	2	1
Charlotte Oil & Fert. Co.'s Catawba Acid.....	10	..	..
Charlotte Oil & Fert. Co.'s Charlotte Dis. Bone...	12	..	..
Charlotte Oil & Fert. Co.'s Charlotte 15 Per Cent Acid Phosphate	15	..	..
Charlotte Oil & Fert. Co.'s Charlotte Acid Phos...	13	..	..
Charlotte Oil & Fert. Co.'s McCrary's Diamond Bone and Potash.....	8	..	3
Charlotte Oil & Fert. Co.'s Ten-Two Bone and Potash.....	10	..	2
Charlotte Oil & Fert. Co.'s Oliver's Perfect Wheat Grower.....	11	3	4
Charlotte Oil & Fert. Co.'s Catawba Guano B. G.,	8	2	1
Charlotte Oil & Fert. Co.'s Queen of the Harvest C. S. M.....	8	2	1
Charlotte Oil & Fert. Co.'s Special 3 Per Cent Guano C. S. M.....	8	3	2
Charlotte Oil & Fert. Co.'s High Grade Special Tobacco Fertilizer	9	2.50	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano B. G.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano C. S. M.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Groom's Special Tobacco Fertilizer	8	3	4
Charlotte Oil & Fert. Co.'s King Cotton Grower...	8	2	2
Charlotte Oil & Fert. Co.'s The Leader B. G.....	8	2	2
Davie & Whittle's Owl Brand Dissolved Bone....	12	..	..
Davie & Whittle's Owl Brand Acid Phosphate....	10	..	..
Davie & Whittle's Owl Brand High Grade Phos...	13	..	..
Davie & Whittle's Owl Brand High Grade Dissolved Bone	14	..	..
Davie & Whittle's Owl Brand Acid Phosphate with Potash.....	10	..	2
Davie & Whittle's Owl Brand Guano.....	8	2	2
Davie & Whittle's Owl Brand Guano No. 2.....	8	2	1
Davie & Whittle's Owl Brand Truck Guano.....	8	6	5
Davie & Whittle's Owl Brand Special Tobacco....	9	2.50	2
Davie & Whittle's Owl Brand Guano for Tobacco,	8	3	3
Davie & Whittle's Vinco Guano.....	8	2	1
Durham Fert. Co.'s Durham Acid Phosphate.....	10	..	..
Durham Fert. Co.'s Blacksburg Dissolved Bone...	13	..	..
Durham Fert. Co.'s Standard High Grade Acid Phosphate.....	13	..	..
Durham Fert. Co.'s N. C. Farmers' Alliance Official Acid Phosphate	13	..	..
Durham Fert. Co.'s Durham H. G. Acid Phosphate,	13	..	..
Durham Fert. Co.'s Excelsior Dis. Bone Phosphate,	14	..	..
Durham Fert. Co.'s Double Bone Phosphate.....	13	..	..
Durham Fert. Co.'s Diamond Wheat Mixture....	10	..	3
Durham Fert. Co.'s Blue Ridge Wheat Grower....	10	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Durham Fert. Co.'s Standard Wheat Grower.....	10	..	2
Durham Fert. Co.'s Carr's Special Wheat Grower.	8	..	4
Durham Fert. Co.'s Great Wheat and Corn Grower.....	10	..	1.50
Durham Fert. Co.'s Bone and Potash Mixture.....	10	..	2
Durham Fert. Co.'s Standard Guano.....	9	2	2
Durham Fert. Co.'s Blacksburg Soluble Guano...	8	2	2
Durham Fert. Co.'s Best Potato Manure.....	7	7	7
Durham Fert. Co.'s L. & M. Special.....	9	3	2
Durham Fert. Co.'s Progressive Farmer Guano....	8	2	1
Durham Fert. Co.'s Special Plant and Truck Fert.,	8	5	3
Durham Fert. Co.'s Golden Leaf Bright Tobacco Guano.....	8	3	3
Durham Fert. Co.'s Durham Ammo'd Fertilizer...	8	2	1
Durham Fert. Co.'s N. C. Farmers' Alliance Official Guano.....	8	2.50	3
Durham Fert. Co.'s Genuine Bone and Peruvian Guano.....	8	2	2
Durham Fert. Co.'s Gold Medal Brand Guano.....	8	3	3
Durham Fert. Co.'s Raw Bone Superphosphate....	8	2.50	1.50
Durham Fert. Co.'s Genuine Bone and Peruvian Guano for Tobacco	8	2	2
Durham Fert. Co.'s Raw Bone Superphosphate for Tobacco.....	8	2.50	2
Lynchburg Guano Co.'s Golden Age Pure Bone Meal..... (Total)	20	4	..
Lynchburg Guano Co.'s Ironside Acid Phosphate..	16	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate...	12	..	..
Lynchburg Guano Co.'s Otter Brand Acid Phos...	10	..	..
Lynchburg Guano Co.'s Arvonja Acid Phosphate...	13	..	..
Lynchburg Guano Co.'s H. G. Acid Phosphate.....	14	..	..
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture	10	..	4
Lynchburg Guano Co.'s Alpine Mixture.....	10	..	5
Lynchburg Guano Co.'s Dis. Bone and Potash.....	10	..	2
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco	8	2	2
Lynchburg Guano Co.'s Lynchburg Soluble.....	8	2	2
Lynchburg Guano Co.'s New Era.....	8	2	1
Lynchburg Guano Co.'s Independent Standard.....	8.50	2	2
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8	2.75	4
Lynchburg Guano Co.'s Bright Belt Guano.....	8	2	..
Norfolk & Car. Chem. Co.'s Norfolk Reliable Acid Phosphate.....	10	..	..
Norfolk & Car. Chem. Co.'s Norfolk Best Acid Phosphate.....	13	..	..
Norfolk & Car. Chem. Co.'s Norfolk Bone and Potash.....	10	..	.2
Norfolk & Car. Chem. Co.'s Crescent Brand Ammo- niated Fertilizer	8	2	1
Norfolk & Car. Chem. Co.'s Cooper's Bright To- bacco Fertilizer	8	2.50	3
Norfolk & Car. Chem. Co.'s Pretlow's Champion for Peanuts, Cotton and Corn.....	8	2	1
Norfolk & Car. Chem. Co.'s Norfolk Truck and Tomato Grower	8	5	5
Norfolk & Car. Chem. Co.'s Genuine Slaughter House Bone	8	2	2
Norfolk & Car. Chem. Co.'s Genuine Slaughter House Bone, made especially for Tobacco.....	8	2.50	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Norfolk & Car. Chem. Co.'s Bright Leaf Tobacco Grower	8	3	3
Norfolk & Car. Chem. Co.'s Amazon H. G. Manure,	8	3	3
Old Dominion Guano Co.'s Norfolk Soluble Bone..	10	..	..
Old Dominion Guano Co.'s H. G. Bone Phos.....	13	..	..
Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate	12	..	..
Old Dominion Guano Co.'s Planters' Bone and Potash Mixture	10	..	3
Old Dominion Guano Co.'s Miller's Special Wheat Mixture.....	8	..	4
Old Dominion Guano Co.'s H. G. Alkaline Bone....	10	..	2
Old Dominion Guano Co.'s Dis. Bone and Potash..	8.50	..	2
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano	6	7	5
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano	7	7	7
Old Dominion Guano Co.'s Isley's Formula of Dis- solved Bone Potash and Chemical.....	8	3	3
Old Dominion Guano Co.'s Bullock's Cotton Grower	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6	2	6
Old Dominion Guano Co.'s Osceola Tobacco Guano.	8	2.50	3
Old Dominion Guano Co.'s Soluble Tobacco Guano,	8	2	2
Old Dominion Guano Co.'s Soluble Guano.....	8	2	2
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer	8	3	3
Old Dominion Guano Co.'s Farmers' Friend Fert..	8	2	2
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano	8	2	1
Old Dominion Guano Co.'s Potato Manure.....	7	5	8
Old Dominion Guano Co.'s Farmers' Friend Spe- cial Tobacco Fertilizer	8	3	3
Powers, Gibbs & Co.'s Fulp's H. G. Acid Phos....	13	..	..
Powers, Gibbs & Co.'s Cotton Brand Acid Phos....	12	..	..
Powers, Gibbs & Co.'s Almont H. G. Acid Phos....	13	..	..
Powers, Gibbs & Co.'s Almont Wheat Mixture....	10	..	3
Powers, Gibbs & Co.'s Cotton Brand H. G. Acid Phosphate.....	13	..	..
Powers, Gibbs & Co.'s Acid Phos. and Potash....	10	..	1
Powers, Gibbs & Co.'s Dis. Bone and Potash.....	10	..	2
Powers, Gibbs & Co.'s Cotton Belt Ammo'd Guano,	8	3	2
Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone	8	2	1
Powers, Gibbs & Co.'s Almont Soluble Ammo- niated Guano	8	2	2
Powers, Gibbs & Co.'s Powers' High Grade Ammo- niated Guano	8	2.50	2
Powers, Gibbs & Co.'s Eagle Island Ammo'd Guano,	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano.....	9	3	2
Powers, Gibbs & Co.'s Carolina Golden Belt Am- moniated Guano for Tobacco.....	8	2.50	3
Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano	8	4	5

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Powers, Gibbs & Co.'s Old Kentucky High Grade Manure.....	8	3	3
Powers, Gibbs & Co.'s Gibbs' High Grade Am- moniated Guano	8	2.50	1
Southern Chem. Co.'s Tar Heel Acid Phosphate...	12	..	..
Southern Chem. Co.'s Horse Shoe Acid Phosphate, ..	10	..	..
Southern Chem. Co.'s Elkin Acid Phosphate.....	12	..	..
Southern Chem. Co.'s Chatham Acid Phosphate...	13	..	..
Southern Chem. Co.'s Click's 16 Per Cent Acid Phosphate.....	16	..	..
Southern Chem. Co.'s Victor High Grade Acid Phosphate.....	13	..	..
Southern Chem. Co.'s Comet 16 Per Cent Acid Phosphate.....	16	..	..
Southern Chem. Co.'s Red Cross 14 Per Cent Acid Phosphate.....	14	..	..
Southern Chem. Co.'s Reaper Grain Application...	12	..	3
Southern Chem. Co.'s Farmers' Pride Bone and Potash.....	10	..	3
Southern Chem. Co.'s Quickstep Bone and Potash,	10	..	1
Southern Chem. Co.'s Mammoth Corn Grower.....	10	..	2
Southern Chem. Co.'s Winner Grain Mixture.....	10	..	4
Southern Chem. Co.'s Winston Bone and Potash Compound.....	10	..	2
Southern Chem. Co.'s Mammoth Wheat and Grass Grower.....	10	..	2
Southern Chem. Co.'s Sun Brand Guano.....	9	2.50	5
Southern Chem. Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8	3	2.50
Southern Chem. Co.'s Yadkin Complete Fertilizer,	8	2	1
Southern Chem. Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8	2.50	3
Southern Chem. Co.'s Electric Standard Guano...	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano.....	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano....	8	2	2
Click's Special Wheat Compound.....	8	..	4
J. G. Tinsley & Co.'s Stone Wall Brand Acid Phos.,	10	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate...	14	..	..
J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	13	..	..
J. G. Tinsley & Co.'s Bone and Potash Mixture...	10	..	2
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower,	6	4	4
J. G. Tinsley & Co.'s Stone Wall Guano.....	8	2	2
J. G. Tinsley & Co.'s Lee Brand Guano.....	8	2	2
J. G. Tinsley & Co.'s 10 Per Cent Truck Guano...	5	10	2.50
J. G. Tinsley & Co.'s Stone Wall Tobacco Guano..	8	2	2
J. G. Tinsley & Co.'s Tobacco Fertilizer.....	8	4	2.50
J. G. Tinsley & Co.'s Irish Potato Guano.....	6	6	6
J. G. Tinsley & Co.'s Richmond Brand Guano.....	8	2	1
J. G. Tinsley & Co.'s Killikinnick Tobacco Mixture,	8	2.50	3
S. W. Travers Co.'s Champion Acid Phosphate....	10	..	..
S. W. Travers Co.'s Capital Dissolved S. C. Bone,	12	..	..
S. W. Travers Co.'s Standard Dissolved S. C. Bone,	13	..	..
S. W. Travers Co.'s Dissolved Bone Phosphate....	14	..	..
S. W. Travers Co.'s Special Wheat Compound...	8	..	4
S. W. Travers Co.'s Capital Bone and Potash Compound.....	10	..	2
S. W. Travers Co.'s Beef Blood and Bone Fert...	8	2	1
S. W. Travers Co.'s Capital Cotton Fertilizer.....	8	2.50	1
S. W. Travers Co.'s Capital Truck Fertilizer.....	8	4	3
S. W. Travers Co.'s Capital Tobacco Fertilizer...	8	4	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
S. W. Travers Co.'s National Spl. Tobacco Fert..	8	2	2
S. W. Travers Co.'s National Fertilizer.....	8	2	2
Va. State Fert. Co.'s Gilt Edge Brand Pure Bone Meal.....(Total)	20	4	..
Va. State Fert. Co.'s Lurich Acid Phosphate.....	10	..	..
Va. State Fert. Co.'s Alps Brand Acid Phosphate,	12	..	..
Va. State Fert. Co.'s Clipper Brand Acid Phos...	13	..	..
Va. State Fert. Co.'s Bull Run Acid Phosphate...	16	..	..
Va. State Fert. Co.'s Gilt Edge Brand Acid Phos..	14	..	..
Va. State Fert. Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.50	..	2
Va. State Fert. Co.'s H. G. Dis. Bone and Potash,	10	..	2
Va. State Fert. Co.'s Mountain Top Bone and Potash.....	10	..	5
Va. State Fert. Co.'s XX Potash Mixture.....	10	..	4
Va. State Fert. Co.'s Bull Dog Soluble Guano.....	8	3	3
Va. State Fert. Co.'s G. E. Spl. Tobacco Grower..	8	2.50	2
Va. State Fert. Co.'s Game Cock Special Guano...	8.50	2	2
Va. State Fert. Co.'s Battle Axe Tobacco Guano...	8	2	2
Va. State Fert. Co.'s Highland King.....	8	2	1
Va. State Fert. Co.'s No. 1 Soluble Guano.....	9	2	..
Va. State Fert. Co.'s Dunnington's Special Form- ula for Tobacco.....	8	3	3
Va. State Fert. Co.'s Austrian Tobacco Grower....	8	2.50	2
Va. State Fert. Co.'s Va. State High Grade To- bacco Guano	8	2	2
Va. State Fert. Co.'s Buffalo Guano.....	8	2.50	3
Va. State Fert. Co.'s Va. State H. G. Guano.....	8	2	2

Venable Fertilizer Co., Richmond, Va.—

Venable's 10 Per Cent Trucker.....	6	10	2
Venable's 5 Per Cent Trucker.....	8	5	5
Venable's 4 Per Cent Trucker.....	8	4	4
Venable's 6-6-6 Manure	6	6	6
Venable's Ideal Manure	8	2	5
Venable's B. B. P. Manure.....	8	2	1
Venable's Alliance Bone and Potash Mixture.....	8	..	4
Venable's Peanut Grower	8	..	4
Venable's Grain and Grass Grower.....	8	..	2
Venable's Alliance Acid Phosphate.....	14	..	..
Venable's Dissolved Bone Phosphate.....	13	..	..
Venable's S. C. Bone.....	10	..	..
Venable's Roanoke Special.....	8	2.50	3
Planters' Bone Fertilizer	8	2	2
High Grade Bone and Potash Mixture.....	10	..	4
Ballard's Choice Fertilizer.....	8	3	3
Roanoke Meal Mixture	9	2.75	2
Bone and Potash Mixture.....	10	..	2
Pure German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Potash .....	..	24	..
Nitrate of Soda .....	..	19	..
Pure Raw Bone Meal.....(Total)	20	4	..
Bone Meal	25	3	..
Venable's H. G. Tobacco Fertilizer.....	8	3	3

Verner Oil Mill, Lattimore, N. C.—

Cotton-seed Meal	8	..
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Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Williams & Clark Fertilizer Co., New York and Charleston, S. C.—</i>			
Americus Ammoniated Bone Superphosphate.....	8	2.25	1
<i>Wilson Grocery Co., Wilson, N. C.—</i>			
Morning Glory	8	3	3
Echo	8	2.50	3
<i>W. H. Worth & Co., Greensboro, N. C.—</i>			
Standard Ammoniated Guano	8	2.50	3
Union Acid Phosphate	14	..	..
Ocala Guano	8	2	2
Worth's XXX	8	3	3
Bone and Potash Mixture.....	10	..	2
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Standard Vegetable	8	3	3
Standard Potato	8	2	5
Standard Grain and Grass Grower.....	8	2	2
High Grade Acid Phosphate.....	14	..	..
Lawn Enricher	5	3	3
Wood's Pure Animal Bone..... (Total)	23	3	..
Bone and Potash	10	..	2
<i>Winborne Guano Co., Tyner, N. C.—</i>			
Soluble Bone and Potash.....	10	..	2
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
High Grade Excelsior Guano.....	8	2	2
High Grade Eureka	8	2	2
High Grade Triumph Guano.....	8	2	2
Winborne's 7 Per Cent Guano.....	5	7	5
King Taming Guano.....	8	3	3
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Animal Bone Meal..... (Total)	20.85	4.67	..

- I. ANALYSES OF FERTILIZERS—SPRING SEASON, 1906.
II. ANALYSES OF COTTON-SEED MEALS.
III. REGISTRATION OF FERTILIZERS.

THE BULLETIN

OF THE

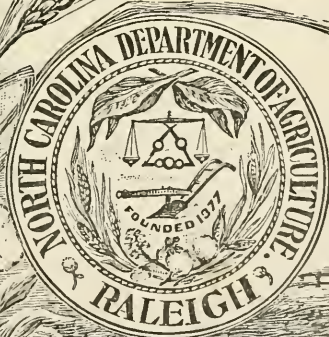
NORTH CAROLINA

STATE BOARD OF

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APRIL, 1906.

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 4.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, APRIL, 1906.

I.—FERTILIZER ANALYSES—SPRING SEASON, 1906.

BY B. W. KILGORE, STATE CHEMIST.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the department, under the direction of the Commissioner of Agriculture, during the spring of 1906. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by, or before, the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in a condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is

thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analysis will help him to do this.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and

potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the costs of fertilizing materials are liable to change as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were :

VALUATIONS FOR 1905.

In Unmixed or Raw Materials.

For ammonia	14½	cents per pound.
For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in fine bone meal.....	3½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For ammonia	16½	cents per pound.
For phosphoric acid.....	4½	cents per pound.
For potash	5½	cents per pound.

The valuations decided on for this season, for the reasons already given, are:

VALUATIONS FOR 1906.

In Unmixed or Raw Materials.

Phosphoric acid in acid phosphate.....	4	cents per pound.
Phosphoric acid in bone meal.....	3½	cents per pound.
Ammonia	14½	cents per pound.
Potash	5	cents per pound.

In Mixed Fertilizers.

Phosphoric acid	4½	cents per pound.
Ammonia	16½	cents per pound.
Potash	5½	cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—2 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and ammonia 2 per cent, the calculation is made as follows:

Percentage or Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton 2,000 Lbs.
8 pounds available phosphoric acid at 4½ cents -----	$0.36 \times 20 =$	\$7.20
2 pounds potash at 5½ cents -----	$0.11 \times 20 =$	2.20
2 pounds ammonia at 16½ cents -----	$0.33 \times 20 =$	6.60
Total value -----	$0.80 \times 20 =$	16.00

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Nor- folk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance -----	\$3.20	\$3.20	\$3.40	\$3.20
Apex -----	2.70	3.20	3.60	3.00
Ashboro -----	3.20	4.00	4.00	3.20
Asheville -----	4.00	3.20	3.90	4.00
Chapel Hill -----	2.95	3.30	3.20	3.20
Charlotte -----	2.65	2.86	3.63	2.83
Clayton -----	2.48	3.60	3.40	3.60
Cherryville -----	3.85	3.00	3.20	3.00
Clinton -----	1.60	3.00	3.80	3.00
Creedmoor -----	3.00	2.40	3.40	3.60
Cunningham -----	3.00	3.60	4.00	2.40
Dallas -----	3.00	3.20	3.20	3.20
Davidson College -----	3.00	3.00	3.20	3.00
Dudley -----	1.70	2.80	3.60	2.83
Dunn -----	2.00	3.20	3.60	3.20
Durham -----	2.80	2.60	3.20	2.60
Elkin -----	3.60	3.80	2.40	3.80
Elm City -----	2.10	3.00	3.00	3.00
Fair Bluff -----	1.60	3.00	3.80	3.06
Fayetteville -----	1.80	3.56	3.86	3.50
Forestville -----	2.85	3.50	3.50	3.50
Gastonia -----	3.00	3.20	3.40	2.80
Gibson -----	2.10	3.00	3.60	3.00
Goldsboro -----	1.80	3.60	3.80	3.00
Greensboro -----	2.96	3.00	3.70	3.60
Hamlet -----	2.00	3.00	3.85	3.60
Henderson -----	2.95	3.08	3.40	3.08
Hickory -----	3.20	2.88	2.68	2.88
High Point -----	3.00	3.00	3.40	3.00
Hillsboro -----	2.88	2.50	3.50	2.50
Kernersville -----	3.00	2.40	3.80	3.40
Kinston -----	2.40	3.40	3.80	3.40
Laurel Hill -----	1.90	3.60	3.80	3.60
Laurinburg -----	1.90	3.00	3.80	3.00
Liberty -----	2.72	3.60	3.70	3.60
Louisburg -----	2.95	3.00	3.85	3.00
Lumberton -----	1.60	3.00	3.00	3.00
Macon -----	3.05	3.20	3.20	3.20
Madison -----	3.10	3.40	3.00	3.40
Matthews -----	2.60	2.40	4.00	2.40
Maxton -----	1.80	3.20	3.40	3.20
Milton -----	3.44	3.60	2.50	3.60
Mocksville -----	3.36	3.40	3.80	3.40
Morven -----	2.55	2.90	3.40	2.90
Mount Airy -----	2.20	1.75	3.95	1.79
Nashville -----	2.30	3.20	3.20	2.23
New Bern -----	1.80	2.83	3.80	2.85
Norwood -----	3.68	3.25	3.00	3.20
Oxford -----	3.04	3.30	4.10	3.30
Pineville -----	2.77	3.00	2.20	3.00
Pittsboro -----	2.60	2.83	3.63	2.83
Polkton -----	2.40	2.96	3.40	2.86
Raleigh -----	2.56	3.00	3.80	3.00
Reidsville -----	3.00	2.50	3.40	2.50
Rockingham -----	2.10	2.80	3.40	2.20
Rocky Mount -----	2.20	3.20	3.60	3.20
Ruffin -----	3.28	3.65	3.40	3.65
Rural Hall -----	3.28	3.20	3.20	3.20
Rutherfordton -----	3.05	3.20	3.40	3.20
Salisbury -----	3.25	3.00	3.40	3.00
Sanford -----	2.10	2.80	3.20	2.80
Selma -----	2.40	3.60	3.40	3.60
Shelby -----	2.95	3.60	3.80	3.60
Siler City -----	2.60	2.80	3.20	2.80
Smithfield -----	2.20	3.20	3.60	3.20
Statesville -----	3.50	2.83	3.80	2.83
Stem -----	2.95	2.40	3.00	2.40
Tarboro -----	2.30	3.60	3.40	3.60
Waco -----	2.90	3.00	2.50	3.00
Wadesboro -----	2.30	3.00	3.40	3.00
Walnut Cove -----	3.12	3.25	4.10	3.25
Warrenton -----	3.05	3.00	3.20	3.00
Warsaw -----	1.50	1.75	2.25	1.50
Washington -----	2.65	1.90	3.85	1.90
Weldon -----	2.55	2.60	3.20	2.60
Wilson -----	2.00	3.00	3.40	3.05
Winston-Salem -----	3.00			

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Potash.	Relative Value per Ton at Factory.		
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Percentage Composition or Parts per 100.						
MIXED FERTILIZERS																	
Brands claiming																	
4763	Baugh & Sons Co., Norfolk, Va.	Baugh's Double Eagle	Aurora	D	7.00	1.80	8.80	.58	1.82	2.00	1.00	\$14.90					
4801	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand Guano, No. 2.	Greenville	R	6.88	2.07	8.95	.44	1.72	2.16	1.35	16.67					
Brand claiming																	
4753	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	Elizabeth City	R	5.38	2.32	7.70	1.70	2.50	2.00	1.50	15.45					
Brands claiming																	
4839	Acme Mfg. Co., Wilmington, N. C.	Cotton-seed Meal Guano	Bethel	R	6.98	1.96	8.94	.48	1.88	2.36	2.53	22.14					
4832	American Fertilizer Co., Norfolk, Va.	American Cotton Compound	Columbia	R	5.05	3.59	8.64	.76	1.46	2.22	2.47	17.19					
4897	do	Bone and Peruvian Guano	Clinton	S	7.20	1.78	8.98	1.16	1.18	2.34	2.29	18.32					
4885	Armour Fertilizer Works, Baltimore, Md.	Armour's General Fertilizer	Washington	R	6.10	2.42	8.52	.98	1.12	2.10	2.20	17.02					
4760	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal and Bone Pot-ash Compound.	Washington	R	6.48	2.02	8.50	.72	1.68	2.40	2.29	18.09					
4782	Bragaw, Wm. & Co., Washington, N. C.	Tar Heel Special Guano for all crops.	Washington	R	5.20	2.71	7.91	.76	1.78	2.54	2.31	18.04					
4898	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Fertilizer	Clinton	R	7.93	1.23	9.16	.76	1.18	1.94	2.04	16.89					
4805	Harrell, S. B. & Co., Norfolk, Va.	Harrell's Champion Cotton and Peanut Grower.	Edenton	R	6.15	3.39	9.54	.68	1.54	2.22	2.04	18.13					
4764	Imperial Company, Norfolk, Va.	Imperial Champion Guano	Edenton	R	4.65	3.12	7.77	.60	1.58	2.18	1.96	16.34					
4828	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Cotton Guano	New Bern	R	5.68	2.89	8.57	.54	1.76	2.30	2.13	18.63					
4765	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Bone and Peruvian Mixture.	Edenton	R	7.35	1.00	8.35	.58	1.54	2.12	2.56	17.33					
4766	do	Piedmont Cultivator Brand	Edenton	S	6.88	1.18	8.06	.62	1.40	2.02	2.77	16.97					
4845	do	Wood's Cotton Grower	Elizabeth City	R	6.88	1.52	8.40	.84	1.32	2.16	2.22	17.13					
4834	Pocomoke Guano Co., Norfolk, Va.	L. P. H. Premium	Plymouth	R	5.98	2.39	8.37	.56	1.86	2.22	1.99	17.05					
4783	do	Pamlico Superphosphate	Washington	R	5.18	2.68	7.86	.60	1.60	2.20	1.89	16.51					
4823	Royster, F. S. Guano Co., Norfolk, Va.	Farmers' Bone Fertilizer	New Bern	R	7.27	1.20	8.47	1.08	1.04	2.12	1.89	16.70					
4865	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand Guano.	Mount Olive	R	6.28	1.97	8.25	.78	1.38	2.16	2.22	16.99					
4748	do	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Edenton	D	6.75	1.77	8.52	.44	1.66	2.10	2.18	17.00					

4861	Va.-Car. Chemical Co., Richmond, Va.	Farmers' Favorite Fertilizer	Mount Olive	R	6.48	2.19	8.67	.18	1.46	1.64	2.55	16.02
4773	do	Old Dominion Guano Co.'s Soluble Guano.	Jamestown	R	6.43	1.80	8.23	.44	1.88	2.32	2.17	17.45
4899	do	Plant Food	Clinton	R	6.90	2.44	9.34	.26	1.94	2.20	2.36	18.27
4901	do	Powers, Gibbs & Co.'s Eagle Island Ammoniated Guano.	Magnolia	R	6.55	2.28	8.83	.78	1.54	2.32	2.14	17.96
4855	do	Travers & Co.'s National Fertilizer.	Warsaw	S	7.03	1.91	8.94	.68	1.26	1.94	3.03	17.78
4771	Winborne Guano Co., Tyner, N. C.	High Grade Excelsior Guano	Tyner	R	5.83	1.96	7.79	.86	1.22	2.08	2.05	16.13
4770	do	High Grade Eureka Guano	Tyner	R	6.08	2.02	8.10	.78	1.32	2.10	2.19	16.63
4904	Navassa Guano Co., Wilmington, N. C.	Ammoniated Soluble Navassa Guano.	Whiteville	R	7.10	1.81	8.91	.94	1.60	2.54	2.05	18.65
4809	Camp, W. H., Petersburg, Va.	Red Head, Camp's Prepared Chemicals.	Hookerton	R	3.20	5.05	8.00	2.14	.66	2.75	2.00	18.47
4883	Pocomoke Guano Co., Norfolk, Va.	Crescent Complete Compound	Edenton	R	5.78	2.38	8.16	.82	1.42	2.24	3.10	17.10
4750	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Onslow Farmers Reliance Guano	Edenton	R	5.93	2.21	8.14	.90	1.80	2.70	3.15	19.70
4888	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Privott's Standard Guano	Edenton	R	7.18	1.36	8.54	1.18	1.36	2.54	3.11	19.49
4825	Richmond Guano Co., Richmond, Va.	Tip Top Fertilizer	New Bern	R	5.88	3.01	8.89	.66	1.88	2.54	2.59	19.23
4747	Va.-Car. Chemical Co., Richmond, Va.	Blue Star	Hamilton	R	6.73	1.69	8.42	.80	2.08	2.38	4.38	20.25
4775	do	Durham Fertilizer Co.'s N. C. Official Farmers Alliance Guano	Elizabeth City	R	7.38	1.16	8.54	.30	2.36	2.86	2.98	20.40
4836	Navassa Guano Co., Wilmington, N. C.	Navassa Strawberry Top Dressing.	Washington	R	5.68	2.43	8.11	.82	2.24	2.50	4.00	19.85
4835	Acme Mfg. Co., Wilmington, N. C.	Acme Fertilizer	Plymouth	R	6.95	1.95	8.00	1.04	2.10	3.00	2.50	19.85
4812	American Fertilizing Co., Norfolk, Va.	American Eagle Guano	Edenton	R	6.33	2.53	8.86	1.04	2.08	3.00	3.00	20.40
4797	Armour Fertilizer Works, Baltimore, Md.	Armour Cotton Special Fertilizer	Hertford	R	6.38	2.52	8.90	1.20	1.96	3.12	2.69	21.23
4884	do	Armour Special Fertilizer	Washington	R	6.13	1.86	7.99	1.14	1.98	3.12	3.11	21.86
4759	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid High Grade Truck Guano	do	R	6.53	1.65	8.18	1.24	2.10	3.34	3.11	21.80
4896	Hampton Guano Co., Norfolk, Va.	Princess Prolific Producer	Clinton	R	6.83	1.28	8.11	1.02	2.10	3.12	3.28	21.20
4829	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Yellow Wrapper Guano.	New Bern	R	4.38	3.72	8.10	1.42	1.44	2.86	3.07	18.10
4837	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Guano	Washington	R	6.58	2.76	9.34	1.20	1.96	3.26	3.82	23.34
4816	Richmond Guano Co., Richmond, Va.	Git Edge Fertilizer	do	R	7.30	2.31	9.61	1.66	1.60	3.26	3.45	23.20
4757	Va.-Car. Chemical Co., Richmond, Va.	Alison & Addison's A. A. Davis & Whittle's Owl Brand Guano.	Faison Greenville	S	7.50	1.82	9.32	1.34	1.66	3.08	3.97	22.65
4749	do	do	Greenville	R	6.58	1.83	8.41	.96	2.12	3.08	3.43	21.50

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Potash.	Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.						
MIXED FERTILIZERS.																
4876	Brand claiming Camp, W. H., Petersburg, Va.	Camp's Prepared Chemicals— Special Yellow Head.	Edenton	R	5.43	3.26	8.00	3.60	.48	3.50	7.50	\$ 27.00	7.85	29.92		
4863	Brand claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Fruit and Berry Guano.	Mt. Olive	R	6.33	1.85	8.18	1.86	1.52	3.00	10.00	28.10	9.73	29.22		
4864	Brand claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Fish, Bone and Potash.	Mt. Olive	R	6.90	1.59	8.49	2.07	1.96	4.00	4.00	25.80	3.99	25.80		
4869	Miller Fertilizer Co., Baltimore, Md.	Miller's Irish Potato	Elizabeth City	S	5.93	2.51	8.49	2.58	1.26	3.84	4.01	24.72	4.01	24.72		
4859	Va.-Car. Chemical Co., Richmond, Va.	V. C. Co.'s Special	Clinton	S	6.68	1.36	8.04	2.31	1.61	3.92	4.15	24.74	4.15	24.74		
4751	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Special Plant and Truck Fertilizer.	Edenton	R	7.05	1.72	8.77	2.80	2.34	5.14	3.00	27.00	3.00	27.00		
4798	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Virginia Fertilizer Co.'s Virginia Trucker.	Weeksville	R	6.68	1.54	8.22	2.14	2.90	5.00	5.00	29.20	5.00	29.20		
4791	Brand claiming Pocomoke Guano Co., Norfolk, Va.	Pocomoke Superphosphate.	Washington	R	5.13	2.41	7.54	.72	1.60	2.00	2.00	16.45	2.00	16.45		
4895	Brand claiming Columbia Guano Co., Norfolk, Va.	Columbia C. S. M. Special	Clinton	R	8.08	1.31	9.39	.96	1.76	2.75	2.00	19.37	2.75	19.37		
4803	Brand claiming American Fertilizing Co., Norfolk, Va.	Pitt County Special Fertilizer	Greenville	R	7.04	3.68	10.72	1.84	1.94	3.78	5.00	25.15	5.00	25.15		
4875	Brand claiming Upshur, R. L., Norfolk, Va.	Upshur's 5 Per Cent Guano	Nixonton	R	2.70	2.65	5.35	2.23	2.42	5.00	5.00	26.50	5.00	26.50		
4871	Brand claiming Baltimore Fertilizer Co., Baltimore, Md.	Honest Albemarle Trucker.	Elizabeth City	S	3.50	2.33	5.83	2.30	1.46	6.00	7.00	32.00	6.07	27.00		
4772	Brand claiming Winborne Guano Co., Tynor, N. C.	Winborne's 7 Per Cent Guano	Tynor	S	4.73	1.42	6.15	2.46	2.72	7.00	5.00	23.10	7.60	26.01		
4886	Brand claiming Armour Fertilizer Works, Baltimore, Md.	Armour's 10 Per Cent Trucker Fertilizer.	Washington	R	5.13	1.14	6.27	5.78	4.74	10.52	3.00	40.80	4.41	27.48		
4804	Brand claiming Home Fertilizer Chemical Co., Baltimore, Md.	Home Potato Grower	Washington	S	2.21	5.50	7.75	1.72	1.73	4.00	4.00	23.00	1.95	42.50		
										3.50	3.85	22.76				

4862	Va.-Car. Chemical Co., Richmond, Va.	James G. Tinsley's Strawberry Grower.	S	6.55	1.87	8.42	1.86	2.25	4.12	2.32	23.73
	Brands claiming										
4752	American Fertilizer Co., Norfolk, Va.	Special Potato Manure	R	4.50	1.54	6.00	2.52	3.04	5.00	7.00	29.60
4758	Baugh & Sons Co., Norfolk, Va.	Baugh's Peruvian Guano Substitute for Potatoes and all Vegetables.	R	5.43	1.39	6.82	2.82	2.05	4.88	7.33	31.85
											30.21
4776	Va.-Car. Chemical Co., Richmond, Va.	V. C. Invincible High Grade Fertilizer for Truck.	R	6.38	.63	7.01	2.94	2.98	5.92	6.88	33.41
	Brand claiming										
4745	Baugh & Sons Co., Norfolk, Va.	Baugh's Cabbage Guano	R	4.98	1.04	6.02	4.12	3.10	7.00	5.00	34.00
	Brands claiming										35.10
4811	American Fertilizing Co., Norfolk, Va.	American Irish Potato Grower	R	4.65	2.61	7.26	2.65	3.36	6.01	5.00	28.30
4813	Pocomoke Guano Co., Norfolk, Va.	Standard Truck Guano	S	4.70	2.37	7.07	2.78	2.34	5.12	5.00	31.01
	Brand claiming										28.76
4889	Navassa Guano Co., Wilmington, N. C.	Navassa Root Crop Fertilizer	R	5.80	1.60	7.40	2.42	2.58	5.00	7.00	30.50
	Brand claiming										32.28
4787	Bragaw, Wm., & Co., Washington, N. C.	Pamlico Truckee	R	4.85	2.30	7.15	1.54	3.48	5.02	8.00	31.60
	Brand claiming										31.78
4815	Richmond Guano Co., Richmond, Va.	Special High Grade for Truck	R	6.55	1.35	7.90	4.38	2.36	6.74	5.52	35.42
	Brands claiming										31.60
4849	Baugh & Sons Co., Norfolk, Va.	Baugh's Soluble Alkaline Superphosphate.	R	1.43	9.07	10.00				2.00	11.20
		Hubbard's Soluble Bone and Potash.	R	4.78	5.52	10.30				2.23	11.90
4927	Hubbard Fertilizer Co., Baltimore, Md.		R								
	Brand claiming										
4877	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Potash Mixture.	R	4.05	7.95	10.00				4.00	13.40
										3.73	14.90

RAW OR UNMIXED FERTILIZER MATERIALS.

4778	Brand claiming										9.60
	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate.	R	10.00	2.90	12.00					10.32
4867	Brands claiming										10.40
	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Dissolved Bone.	R	10.93	3.27	14.20					11.36
4851	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Va. Fert. Co.'s Greshaw's Acid Phosphate.	R	9.70	3.47	13.17					10.54
4777	Brands claiming										11.20
	American Agricultural Chemical Co., New York City.	Lazaretto Dissolved Bone Phosphate.	R	11.63	2.91	14.54					11.63
4755	American Fertilizing Co., Norfolk, Va.	High Grade Acid Phosphate	R	12.10	1.90	14.00					11.20

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

4768	Pocomoke Guano Co., Norfolk, Va.	do	do	B	11.56	11.56
4947	Richmond Guano Co., Richmond, Va.	Pure German Kainit	Grifton	S	12.48	12.48
4820	Upshur, R. L., Norfolk, Va.	Genuine German Kainit	Elizabeth City	S	13.14	13.14
4894	Va.-Car. Chemical Co., Richmond, Va.	do	Edenton	S	12.58	12.58
4780	Winborne Guano Co., Tyner, N. C.	do	Tyner	R	11.78	11.78
	Brand claiming				2.00	2.00
4807	Lee, A. S., & Sons Co., Richmond, Va.	Lee's Prepared Agricultural Lime.	Edenton	R	2.28	2.28

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

II. ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Ammonia Found.
2003	Battleboro Oil Co., Battleboro, N. C.	Battleboro	8.36
986	do	do	8.16
2038	do	do	8.05
973	do	do	8.02
988	do	do	7.68
2002	do	do	7.50
995	do	do	7.46
968	Chatham Cotton Oil Co., Pittsboro, N. C.	Pittsboro	8.02
957	Clayton Oil Mill, Clayton, N. C.	Clayton	7.60
2011	do	do	7.50
981	Cotton Oil and Ginning Co., Scotland Neck, N. C.	Scotland Neck	7.72
2023	Elba Mfg. Co., Charlotte, N. C.	Charlotte	8.05
977	Fremont Oil Mill Co., Fremont, M. C.	Fremont	7.94
992	Haven's Oil Co., Washington, N. C.	Washington	7.60
990	Laurinburg Oil Co., Laurinburg, N. C.	Laurinburg	8.12
983	Lenoir Oil and Ice Co., Kinston, N. C.	Kinston	8.72
975	do	do	8.58
954	do	do	8.36
955	do	do	8.32
970	do	do	8.30
993	do	do	8.28
953	do	do	8.24
998	do	do	8.08
985	Louisburg Cotton Oil Mill, Louisburg, N. C.	Louisburg	8.36
965	N. C. Cotton Oil Co., Charlotte, N. C.	Charlotte	7.44
956	N. C. Cotton Oil Co., Henderson, N. C.	Henderson	7.96
966	N. C. Cotton Oil Co., Raleigh, N. C.	Raleigh	8.20
987	Pine Level Oil Mill, Pine Level, N. C.	Pine Level	8.66
967	Pitt County Oil Co., Winterville, N. C.	Winterville	8.36
952	Planters Cotton Seed Oil Co., Rocky Mount, N. C.	Rocky Mount	7.94
962	do	do	7.78
997	Red Springs Oil and Fertilizer Co., Red Springs, N. C.	Red Springs	7.96
976	Rowland Oil and Fertilizer Co., Rowland, N. C.	Rowland	7.74
2010	Southern Cotton Oil Co., Wilson, N. C.	Edenton	7.02
969	Springhope Cotton Oil Co., Springhope, N. C.	Springhope	7.86
974	Verner Oil Co., Lattimore, N. C.	Lattimore	8.30
2022	Wrendale Oil Mill Co., Battleboro, N. C.	Battleboro	8.40
982	do	do	7.94
999	do	do	7.48

III. FERTILIZER BRANDS REGISTERED FOR 1906.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The American Agricultural Chemical Co., New York, N. Y.—</i>			
Zell's 10 Trucker.....	5	10	3
Zell's 7 Per Cent Potato and Vegetable Manure...	6	7	5
Zell's Truck Grower.....	7	5	5
Zell's Special Compound for Potatoes and Vegetables	8	3	4
Zell's Tobacco Fertilizer	8	3	4
Zell's Bright Tobacco Grower.....	8	3	3
Zell's Reliance High Grade Manure.....	8	3	3
Zell's Victoria Animal Bone Compound.....	9	2.25	4
Zell's Magnet	8	2.50	2
Zell's Royal High Grade Fertilizer.....	9	2.50	2
Zell's Fish Guano	8	2	2
Zell's Calvert Guano	8	2	2
Zell's Animal Bone Superphosphate.....	8	2	1
Zell's High Grade Potash Fertilizer.....	10	..	4
Zell's Electric Phosphate.....	10	..	2
Zell's Dissolved Bone Phosphate.....	14	..	..
Reese Dissolved Phosphate of Lime.....	14	..	..
Reese Crown Phosphate and Potash.....	11	..	2
Reese Pacific Guano	8	2	2
Reese Pacific Guano for Tobacco.....	8.50	3	2.50
Maryland Globe Complete Manure.....	8	2	2
Maryland Dissolved S. C. Bone.....	14	..	..
Lazaretto Challenge Fertilizer.....	8	3	3
Lazaretto Special for Tobacco and Peanuts.....	8	3	3
Lazaretto Universal Compound	8	2.50	2
Lazaretto Climax Plant Food.....	8	2.50	3
Lazaretto Retriever Animal Bone Fertilizer.....	9	2.25	4
Lazaretto Crop Grower	8	2	2
Lazaretto High Grade Dissolved Bone and Potash,	12	..	5
Lazaretto Alkaline Bone Phosphate	12	..	3
Lazaretto Dissolved Bone and Potash	10	..	2
Lazaretto Acid Phosphate	14	..	..
Slingluff's British Mixture	8	2.50	2.50
Clark's Orinoco Tobacco Fertilizer.....	8	3	4
Detrick's Special Tobacco Fertilizer.....	8	3	4
Detrick's Quickstep Bone Phosphate.....	8	3	4
Detrick's Special High Grade	8	3	3
Detrick's Vegetable Ammonia Superphosphate....	8	2.50	3
Detrick's Soluble Bone Phosphate and Potash....	10	..	2
Detrick's P. & B. Special Fertilizer.....	12	..	3
Detrick's Fish Mixture	8	2	2
Detrick's Royal Crop Grower	8	2	2
Detrick's Kangaroo Komplete Kompound.....	8	2	3
Detrick's Superior Animal Bone Fertilizer.....	9	2.25	4
Detrick's XXtra Acid Phosphate	14	..	..
Square Deal Phosphate for General Crops.....	8	2	4
Canton Chemical Baker's Dissolved S. C. Bone....	14	..	..
Canton Chemical Soluble Bone and Potash.....	10	..	2
Canton Chemical Soluble Alkaline Bone.....	12	..	3
Canton Chemical Game Guano.....	8	2	2
Canton Chemical Colonial Compound.....	9	2	2
Canton Chemical Animal Bone Fertilizer.....	9	2.25	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Canton Chemical Virginia High Grade Manure...	8	2.50	2
Canton Chemical Baker's Standard High Grade Guano	8	2.50	3
Canton Chemical Baker's Tobacco Fertilizer.....	8	3	3
Canton Chemical Superior High Grade Guano....	8	3	3
Canton Chemical Excelsior Trucker.....	7	5	2
Canton Chemical Trucker's Special 7 Per Cent Guano	6	7	5
16 Per Cent Superphosphate	16	..	..
Kainit .....	..	..	12
Triumph Alkaline Bone.....	8	..	5
W. P. Baugham's Honey Pod Pride.....	8	4	5
W. P. Baugham's Cottage Grove Special Trucker..	6	9	4
Young's Melon Fertilizer.....	10	3	10
Savage, Son & Co.'s Purity Guano.....	8	2	2
Holmes & Dawson Triumph Soluble.....	8	2	2
Holmes & Dawson Gold Dust Guano.....	9	2	2
Holmes & Dawson Productive Cotton and Peanut Grower.....	9	2.25	2
Victor Bone and Potash.....	8	..	3
Ground Fish Scrap.....	..	11	..
Pure Ground Bone..... (Total)	45	4	..

George L. Arps & Co., Norfolk, Va.—

Big Yield Guano	8	2	2
14 Per Cent Acid Phosphate.....	14	..	..
High Grade Premium Guano for Cotton, Tobacco and all Spring Crops.....	8	2	2
Kainit .....	..	..	12
Arp's Potato Guano.....	6	7	5
Arp's Standard Truck Guano.....	7	5	5

Atlantic Chemical Co., Norfolk, Va.—

Atlantic Soluble Guano	8	2	2
Atlantic H. G. Cotton Guano.....	8	3	3
Atlantic Special Guano	8	2	1
Atlantic Cotton Grower	8	2.50	1
Atlantic Meal Compound	9	2.75	2
Atlantic H. G. Tobacco Guano.....	8	3	3
Atlantic Tobacco Compound	8	2.50	2
Atlantic Tobacco Grower	8	2.50	3
Atlantic 7 Per Cent Truck Guano.....	7	7	7
Atlantic Special Truck Guano.....	8	4	4
Atlantic Potato Guano	7	5	5
Atlantic Special Wheat Fertilizer.....	8	2	2
Atlantic Bone and Potash Mixture.....	10	..	2
Atlantic 10 and 4 Bone and Potash Mixture.....	10	..	4
Atlantic 8 and 2 Bone and Potash Mixture.....	8	..	2
Atlantic 8 and 4 Bone and Potash Mixture.....	8	..	4
Atlantic Bone and Potash for Grain.....	10	..	3
Atlantic H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Atlantic 14 Per Cent Acid Phosphate.....	14	..	..
Atlantic H. G. Dissolved Bone.....	13	..	..
Atlantic Acid Phosphate	12	..	..
Oriental H. G. Guano	8	4	4
Perfection Peanut Grower	7	..	5
Genuine German Kainit .....	..	..	12
Nitrate of Soda .....	..	19	..
Muriate of Potash .....	..	..	48

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Sulphate of Potash .....	..	..	50
Cotton-seed Meal .....	..	7.50	..
Atlantic H. G. Cotton Guano.....	8	3	3

Anderson Phosphate and Oil Co., Anderson, S. C.—

Anderson High Grade Phosphate.....	13
Anderson Special Dissolved Bone.....	14	..	..
Anderson Blood and Bone Guano.....	8	2	2
Anderson Soluble Guano	8	2	1
Anderson Truck Fertilizer	8	4	4
Anderson Cotton Fertilizer.....	8	2	2
Anderson Blood Guano	8	2	2
Anderson Wheat Grower	8	2	2
Anderson Special Fertilizer	8	3	3
Anderson High Grade Petrified Bone and Potash..	10	..	4
Anderson Special Petrified Dissolved Bone.....	15	..	..
Anderson Petrified Bone and Potash.....	10	..	2
Anderson Standard Petrified Bone Guano.....	8	2	2
Anderson XX Potash Bone.....	10	..	2
Anderson XXX Potash Bone.....	8	..	4
Anderson XXXX Potash Bone.....	10	..	4
Anderson Superphosphate	16	..	..
Anderson Kainit .....	..	..	12

A. D. Adair & McCarty, Atlanta, Ga., and Chattanooga, Tenn.—

David Harum High Grade Guano.....	10	4	4
Adair's High Grade Blood and Bone.....	10	3	3
Adair's High Grade Dissolved Bone No. 16.....	16	..	..
Adair's Special Potash Mixture	8	..	4
Adair's Wheat and Grass Grower	10	..	4
Adair's High Grade Potash Compound.....	10	..	4
Adair's High Grade Dissolved Bone.....	14	..	..
Adair's Dissolved Bone.....	12	..	..
McCarty's Potash Formula	12	..	2
McCarty's Potash Formula No. 4.....	12	..	4
McCarty's High Grade Cotton Grower.....	10	2	2
Planter's Soluble Fertilizer	8	2	2
A. & M. 13-3	13	..	3
A. & M. 13-4	13	..	4
Adrian's Ammoniated Dissolved Bone.....	8	2	2
Special Cotton Compound	10	2	4
Old Fine Fish Scrap Guano.....	10	2	2

American Fertilizer Co., Norfolk, Va.—

Ten Per Cent Ammonia Guano.....	7	10	2.50
Standard 7 Per Cent Ammonia Guano.....	7	7	5
Special Potato Manure	6	5	7
American Irish Potato Grower	7	5	5
American 7-7-7 for Irish Potatoes	7	7	7
Special Potato Guano	7	5	7
Strawberry Guano	9	3.50	9
Kale, Spinach and Cabbage Guano.....	7	5	4
Low Grade Special Formula Guano.....	7	4	4
Stable Manure Substitute	7	3	4
American Ammoniated Bone	8	2	1
Peruvian Mixture	8	2	1.50
Bone and Peruvian Guano.....	8	2	2
Bone and Peruvian Guano for Tobacco.....	8	2	2
Blood and Bone Compound	8	2.50	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
American Cotton Compound	8	2	2
American Eagle Guano	8	3	3
Bob White Fertilizer for Tobacco	8	2.50	2.50
J. G. Miller & Co.'s Yellow Leaf Fertilizer.....	8	3	3
A. L. Hannah Special Formula Guano.....	8	2	2
Special Formula Guano for Yellow Leaf Tobacco..	9	3.50	5
Murray's Special Fertilizer	8	3	3
Pitt County Special Fertilizer	9	3.50	5
Peruvian Mixture Guano, especially prepared for sweet potatoes	8	4	5
Johnson's No. 1 Fertilizer	8	2.50	3
High Grade Acid Phosphate	14	..	..
American High Grade Acid Phosphate.....	16	..	..
Eagle High Grade Acid Phosphate.....	13	..	..
Acid Phosphate	12	..	..
Acid Phosphate	10	..	..
Bone and Peruvian Guano	8.50	2	2.10
American Special Potash Mixture for Wheat.....	8	..	4
Dissolved Bone and Potash for Corn and Wheat..	10	..	2
Double Dissolved Bone and Potash.....	10	..	4
Pure Dissolved Bone	14	2.50	..
Bone Meal	21	3.50	..
Tankage.....	..	7	..
Ground Fish Scrap .....	..	10	..
Genuine German Kainit .....	..	..	12
Sulphate of Potash .....	..	..	49
Muriate of Potash.....	..	..	50
Sulphate of Ammonia .....	..	25	..
Nitrate of Soda .....	..	19	..
W. B. Cooper's Cape Fear Acid.....	12	..	..
W. B. Cooper's High Grade Fertilizer.....	8	3	3
W. B. Cooper's Cotton Grower.....	8	2	2
W. B. Cooper's High Grade Acid.....	14	..	..
W. B. Cooper's Pure German Kainit.....	..	..	12

Ashepool Fertilizer Co., Charleston, S. C.—

Ashepool Fertilizer	9	2.25	1
Ashepool Harrow Brand Raw Bone Superphos- phate.....	9	2	2
Ashepool Wheat and Oat Specific.....	9	2	1
Ashepool XXX Guano.....	8.65	2	2
Ashepool XX Guano	8.50	2	2
Ashepool Fruit Grower	8	4.75	2.75
Ashepool Perfection Guano	8	4	6
Ashepool High Grade Guano.....	8	4	4
Ashepool Golden Tobacco Producer.....	8	3	3
Ashepool Bird and Fish Guano.....	8	3	3
Ashepool X Tobacco Fertilizer.....	8	3	3
Ashepool Meal Mixture	8	3	3
Ashepool Special Cotton-seed Meal Guano.....	8	3	3
Ashepool High Grade Ammoniated Superphosphate,	8	3	2
Ashepool Circle Guano.....	8	2.50	2
Ashepool Guano	8	2.50	1
Ashepool Special Fertilizer	8	2	2
Ashepool Farmers' Special.....	8	2.50	3
Ashepool Truck Guano	7	5	5
Ashepool Vegetable Guano.....	5	5	5
Ashepool High Grade Acid Phosphate and Potash..	12	..	1
Ashepool Potash Acid Phosphate.....	11	..	1
Ashepool Potash Compound	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Ashepoo Superpotash Acid Phosphate.....	11	..	4
Ashepoo Dissolved Phosphate	16	..	..
Ashepoo XXXX Acid Phosphate.....	14	..	..
Ashepoo XXX Acid Phosphate.....	13	..	..
Ashepoo High Grade Acid Phosphate.....	13	..	..
Ashepoo Dissolved Bone	12	..	..
Ashepoo XX Acid Phosphate.....	12	..	..
Eutaw XX Acid Phosphate.....	12	..	..
Eutaw High Grade Acid Phosphate.....	13	..	..
Eutaw Superpotash Acid Phosphate.....	10	..	4
Eutaw Potash Acid Phosphate.....	11	..	1
Eutaw High Grade Phosphate and Potash.....	12	..	1
Eutaw Circle Guano.....	8	2.50	2
Eutaw X Golden Fertilizer.....	8	3	4
Eutaw Special Cotton-seed Meal Guano.....	8	3	4
Eutaw XX Guano	8.50	2	2
Eutaw XXX Guano.....	9	2	2
Eutaw Fertilizer	9	2.25	1
Enoree Acid Phosphate and Potash.....	10	..	2
Carolina High Grade Acid Phosphate.....	13	..	..
Carolina Guano	8	2	2
Carolina XXX Guano.....	8	3	3
Circle Bone	13	..	..
Coomassie Acid Phosphate.....	12	..	..
Coomassie Circle Fertilizer.....	8	2	2
Bronwood Acid Phosphate	8	..	4
P. D. Fertilizer	8	2	1
Palmetto Potash Acid Phosphate.....	11	..	1
Taylor's Circle Guano.....	9	2	4
German Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	45
Ashepoo Watermelon Guano.....	10	4	5

Acme Manufacturing Co., Wilmington, N. C.—

Acme Acid Phosphate Rock.....	13
Acme High Grade Acid Phosphate.....	14	..	..
Acme Special Grain	8	2	2
Acme Fertilizer	8	3	2.50
Acme Truck Grower.....	6	4	8
Acme Fertilizer for Tobacco.....	8	3	2.50
Acme Soluble Guano.....	8	2.50	1
Acme Standard Guano.....	8	2.50	2
Acme Cotton Grower	9	2.75	2
Acme High Grade Guano.....	6	6	8
Tip Top Crop Grower.....	8	2.50	3
Pee Dee Special.....	8	3	3
Gem Fertilizer	8	2	2
Quick Step Fertilizer.....	8	4	4
Lattimore's Complete Fertilizer.....	8	2.50	2
Cotton-seed Meal Guano.....	8	2	2
Acid Phosphate	12	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Strawberry Top Dresser.....	8	2	4
Bone and Potash 11 and 2.....	11	..	2
Bone and Potash 8 and 4.....	8	..	4
Bone and Potash 8 and 3.....	8	..	3
Bone and Potash 8 and 2.....	8	..	2
Bone and Potash 10 and 4.....	10	..	4
Bone and Potash 10 and 3.....	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bone and Potash 10 and 2.....	10	..	2
Pure German Kainit.....	12
Nitrate of Soda 18 Per Cent.....	..	18	..
Muriate of Potash.....	48
Sulphate of Potash.....	48

The Armour Fertilizer Works, Baltimore, Md.—

13 Per Cent Acid Phosphate.....	13	..	..
Star Phosphate.....	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Phosphate and Potash.....	10	..	2
Phosphate and Potash No. 2.....	8	..	5
Superphosphate and Potash.....	10	..	4
Wheat Grower.....	10	..	4
Phosphoric Acid and Potash.....	10	..	5
General.....	8	2	2
Fruit and Root Crop Special.....	8	2	5
High Grade Potato.....	8	2	10
Bone and Dissolved Bone and Potash.....	9	2	3
King Cotton.....	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion.....	8	2.50	2.50
Berry King.....	8	2.50	4
Cotton Special.....	8	3	3
Ammoniated Bone with Potash.....	6	3	2
Tobacco Special.....	8	3	3
African Cotton Grower.....	9	3	3
Truck and Berry Special.....	8	3	10
Manure Substitute.....	6	4	4
Special Trucker.....	8	4	4
Bone, Blood and Potash.....	8	5	7
All Soluble.....	8	3.50	4
7 Per Cent Trucker.....	6	7	5
Top Dresser.....	5	10	2
10 Per Cent Trucker.....	5	10	3
Acidulated Bone Meal.....	18	12	..
Bone Meal.....(Total)	24	3	..
Raw Bone.....(Total)	23	4.50	..
Dried Blood.....	..	16	..
German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of potash.....	..	..	50
Fish Mixture.....	8	2	2
Blood and Bone.....	8	3	3
Tankage.....	9	8	..
Fish Scrap.....	7	11	..
Kainit.....	..	..	16

Asheville Packing Co., Asheville, N. C.—

Zimmerman's Blood and Bone Fertilizer.....	10.46	4.34	2.80
Zimmerman's Standard.....	9.30	3.80	2.80
Zimmerman's Wheat and Potato Fertilizer.....	6.45	3.67	3.31
Zimmerman's Garden Fertilizer.....	8	5	5

Baugh & Sons Co., Norfolk, Va.—

Glover's Special Potato Guano.....	7	4	8
Baugh's Dissolved Animal Bone.....	13	2.50	..
Baugh's New Process 10 Per Cent Guano.....	5	10	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Baugh's 7 Per Cent Potato Guano.....	6	7	5
Baugh's Cabbage Guano.....	6	7	5
Baugh's Peruvian Guano Substitute.....	6	5	7
Baugh's Fruit and Berry Guano.....	8	3	10
Baugh's High Grade Tobacco Guano.....	8	..	3
Baugh's Grand Rapid Guano.....	8	3	3
Grand Rapid High Grade Truck Guano.....	8	3	3
Baugh's Animal Bone and Potash Compound for all crops	8	2	2
Baugh's Wheat Fertilizer for Wheat and Grass...	8	2	2
Baugh's Fish Mixture	8	2	2
Baugh's Soluble Alkaline Superphosphate.....	10	..	2
Baugh's High Grade Potash Mixture.....	10	..	4
Baugh's Double Eagle Twenty-five Phosphate, or Raw Bone Superphosphate.....	8	2	1
Baugh's Peruvian Guano Substitute, for Potatoes and all vegetables.....	6	5	7
Baugh's Raw Bone Meal, warranted pure (Total),	21.50	4.50	..
Baugh's High Grade Acid Phosphate.....	14	..	..
16 Per Cent Acid Phosphate	16	..	..
Fish Bone and Potash.....	8	4	4
Ground Fish .....	..	10	..
Genuine German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..

Baltimore Fertilizer Co., Baltimore, Md.—

Honest Potato and Tomato Grower.....	8	3	3
Honest Trucker	6	5	5
Honest Revenue	7	3	6
Honest Sweet Potato Grower.....	8	2	4
Honest Dixie Crop Grower.....	8	2	2
Honest Albemarle Trucker	6	5	7

The John L. Bailey Co., Elm City, N. C.—

Stag Brand	8	2	2
Fair Mount	8	3	3

*Bradley Fertilizer Co., Boston, Mass., and
Charleston, S. C.—*

B. D. Sea Fowl Guano.....	9	2.25	1
Bradley's Patent Superphosphate.....	9	2.25	1
Bradley's High Grade Guano.....	8	3	3
Bradley's X Guano	8	2	2
Bradley's Ammoniated Dissolved Bone.....	8	2.25	1
Bradley's Eagle Ammoniated Bone Superphos- phate	8	2.25	1
Bradley's Cereal Guano.....	8	2	2
Bradley's Wheat Grower.....	10	..	2
Bradley's High Grade Acid Phosphate.....	14	..	..
Bradley's XXX Acid Phosphate.....	13	..	..
Bradley's Acid Phosphate.....	12	..	..
Bradley's Palmetto Acid Phosphate.....	12	..	..
German Kainit .....	..	..	12
Bradley's Bone and Potash.....	10	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>James Bonday, Jr., & Co., Baltimore, Md.—</i>			
Old Reliable Brand Genuine German Kainit....	..	..	12
No. 1 Syndikat Muriate of Potash.....	..	..	50
No. 1 Syndikat Sulphate of Potash.....	..	..	48
Nitrate of Soda.....	..	18	..
<i>Battleboro Oil Co., Battleboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Resolute Acid Phosphate.....	16	..	..
Laurel Potash Mixture.....	10	..	2
Berkley Plant Food.....	10	..	4
Berkley Acid Phosphate.....	14	..	..
Berkley Ammoniated Superphosphate.....	8	2	1
Select Crop Grower	8.50	2.50	2.50
Brandon Superphosphate	8	2	2
Monitor Animal Bone Fertilizer.....	9	2.25	4
Berkley Tobacco Guano.....	8	3	3
Advance Crop Grower.....	8	3	3
Victory Special Crop Grower.....	7	4	4
Royal Truck Grower.....	6	7	5
Mascot Truck Guano.....	7	5	5
Berkley Bone and Potash Mixture.....	11	..	2
Berkley Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
<i>Big Lick Cotton Seed Oil Mill Co., Big Lick, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Acid Phosphate	14	..	..
Burton's High Grade.....	8	2.50	3
Burton's Butcher Bone.....	8	2	2
Burton's Carolina Guano.....	8	2	1
Burton's Best	8	3	3
Burton's Soluble Guano.....	8	2	1
Tobacco Queen	8	3	3
High Grade Tobacco.....	8	4	4
<i>William Bragaw & Co., Washington, N. C.—</i>			
Tar Heel Special Guano.....	8	2	2
Pamlico Trucker	7	5	8
Havana Tobacco Guano.....	8	3	3
Beaufort County Guano.....	8	3	3
Tuckahoe Tobacco Guano.....	8	2.50	3
Cchocowinity Special Tobacco.....	5	4	6
Old reliable Premium.....	8	2	2
Cotton-seed Meal .....	..	7.50	..
<i>Blackstone Guano Co., Blackstone, Va.—</i>			
Red Letter	8	2	2
Alliance for Tobacco.....	8	2	2
Old Bellefonte	8	4	2
Bellefonte	8	3	2
Hard Cash	8	2.50	2
Alliance	8	2	2
B. G. Co. Acid Phosphate.....	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
B. G. Co. Bone and Potash.....	10	..	2
Jim Crow	8	3	2
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano	8	3	3
Cotton-seed Meal .....	..	7.50	..
<i>Columbia Guano Co., Norfolk, Tarboro, Columbia, S. C., Macon, Ga.—</i>			
Olympia Cotton Guano.....	8	3	3
Columbia Soluble Guano.....	8	2	2
Columbia C. S. M. Special.....	9	2.75	2
Columbia H. G. Special Tobacco Guano.....	8	2.50	2
Columbia 7 Per Cent Truck Guano.....	7	7	7
Columbia Special Truck Guano.....	8	4	4
Columbia Potato Guano.....	7	5	5
Columbia Special 4-8-3.....	8	4	3
Columbia Special Wheat Fertilizer.....	8	2	2
Columbia Bone and Potash Mixture.....	10	..	2
Columbia 10-4 Bone and Potash Mixture.....	10	..	4
Columbia 8-2 Bone and Potash Mixture.....	8	..	2
Columbia 8-4 Bone and Potash Mixture.....	8	..	4
Columbia Bone and Potash for Grain.....	10	..	3
Columbia H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Columbia 14 Per Cent Acid Phosphate.....	14	..	..
Columbia Acid Phosphate.....	12	..	..
Columbia H. G. Dissolved Bone.....	13	..	..
Rex Brand Ammoniated Guano.....	8	2.50	1
Crown Brand Peanut Guano.....	7	..	5
Carolina Soluble Guano.....	8	2	1
Pelican Ammoniated Guano.....	8	4	4
Hyco Tobacco Guano.....	8	3	3
McRae's High Grade Guano.....	8	4	7
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	48
Nitrate of Soda.....	..	19	..
Columbia 8-2.25 Bone and Potash Mixture.....	8	..	2.25
Columbia Special	8	4	3
McRae's Special	8	5	7
Hayes' Special	8	4	3
Crews' Special	5.85	5.45	10
<i>Cumberland Bone Phosphate Co., Portland, Me., and Charleston, S. C.—</i>			
Cumberland Bone Superphosphate of Lime.....	8	2.25	1
<i>Cotton Oil and Fibre Co., Norfolk, Va.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Consumers Cotton Oil Co., Tarboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Chatham Cotton Oil Co., Pittsboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Campobello Oil Mill, Campobello, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The Cotton and Ginning Co., Scotland Neck, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Chickamauga Cotton Compound.....	10	2	4
Chickamauga High Grade Plant Food.....	10	2	2
Chickamauga High Grade Fertilizer.....	10	2	2
Chickamauga Complete Fertilizer.....	8	2	2
Chickamauga Alkaline Bone.....	8	..	4
Chickamauga Bone and Potash.....	10	..	2
Chickamauga Wheat and Corn Grower.....	10	..	4
Chickamauga Dissolved Bone.....	12	..	2
Chickamauga High Grade Dissolved Bone.....	14	..	..
Chickamauga High Grade Dissolved Bone No. 16..	16	..	..
Chickamauga 12-2	12	..	2
Chickamauga 12-4	12	..	4
Chickamauga 13-4	13	..	4
Chickamauga 13-2	13	..	2
Ben Hur High Grade Guano.....	10	3	3
Georgia Homestead Guano.....	8	2	2
Chickamauga Fish Scrap Guano.....	10	2	2
<i>Calder Bros., Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
<i>W. B. Cooper, Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	50
<i>Cowell, Swan & McCotter Co., Bayboro, N. C.</i>			
Cowell, Swan & McCotter Co.'s Cabbage Guano...	5	10	2.50
Cowell, Swan & McCotter Co.'s Great Cabbage and Potato Guano	7	7	7
Cowell, Swan & McCotter Co.'s Oriental Trucker..	6	6	6
Cowell, Swan & McCotter Co.'s H. G. Truck Guano,	7	5	5
Cowell, Swan & McCotter Co.'s Potato Favorite Guano	7	4	7
Cowell, Swan & McCotter Co.'s Champion Guano..	8	3	3
Cowell, Swan & McCotter Co.'s Quick Grower Guano	8	2.50	3
Cowell, Swan & McCotter Co.'s Standard Cotton Grower	8	4	3
Cowell, Swan & McCotter Co.'s Rust Proof Cotton Guano.....	8	2	3
Cowell, Swan & McCotter Co.'s Bone and Fish Guano	8	2	2
Cowell, Swan & McCotter Co.'s Crop Grower.....	8	2	2
Cowell, Swan & McCotter Co.'s 14 Per Cent Acid Phosphate	14	..	..
Cowell, Swan & McCotter Co.'s Bone Phosphate...	14	..	..
Cowell, Swan & McCotter Co.'s Bone Potash Com- pound	10	..	2
Cowell, Swan & McCotter Co.'s Fish and Kainit Compound	5	4	3
German Kainit .....	..	..	12
Aurora Trucker	7	5	7

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The Coc-Mortimer Co., Charleston, S. C.—</i>			
Peruvian Guano Ex Condor.....	8.50	8.30	2
Peruvian Guano Ex Coya.....	9	9	2
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	49
<i>Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—</i>			
Crown Ammoniated Guano.....	8	2	1.50
Comet Guano	8	2	1
Planters' Pride	8	2.50	3
Eli Ammoniated Guano.....	8	2	2
Eclipse Ammoniated Guano.....	8	2.50	2
Horne's Best	8	3	3
Caraleigh Special Tobacco Grower.....	8	2.50	3
Dandy Acid Phosphate.....	10	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Climax Dissolved Bone.....	14	..	..
Staple Acid Phosphate.....	12	..	..
Sterling High Grade Acid Phosphate.....	13	..	..
Electric Bone and Potash.....	10	..	2
Horne & Son's High Grade Bone and Potash....	11	..	5
Morris & Scarboro's Special Bone and Potash Mix- ture	10	..	3
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Pacific Tobacco and Cotton Grower.....	9	2.75	2
<i>W. H. Camp, Petersburg, Va.—</i>			
Camp's Prepared Chemicals No. 1.....	8	3.50	7.50
Camp's Prepared Chemicals No. 3.....	8	2.75	2
Camp's Prepared Chemicals for Irish Potatoes....	7	7.50	10
Camp's Bone and Potash.....	10	..	4
Camp's Special for Tobacco.....	8	3	3
<i>Crow Fertilizer Co., Monroec, N. C.—</i>			
Crow's Union County Special.....	8	2	2
Crow's H. G. Blood and Fish.....	8	3	3
Crow's 14 Per Cent Acid Phosphate.....	14	..	..
Crow's Kainit .....	..	..	12
<i>Dixie Guano Co., Durham, N. C.—</i>			
Niagara Soluble Bone.....	8	2.50	2
Battle's Blood and Bone.....	8	2.50	3
Dixie Champion for Wheat and Corn.....	10	..	1.50
Dixie Star Ammoniated 8-2-1.....	8	2	1
Jeff Davis Special.....	9	2.75	2
Carolina Special Ammoniated.....	8	3	3
Radium	8	4	5
Sulky Plow Brand.....	8	3	2
Old Plantation Superphosphate.....	8	2	2
<i>Ethiwan Fertilizer Co., Charleston, S. C.—</i>			
Plow Brand Ammoniated Dissolved Bone.....	8.65	2	2
Plow Brand Raw Bone Superphosphate.....	8	2.50	1
Plow Brand Special Tobacco Fertilizer.....	8	4	4
Plow Brand Acid Phosphate with Potash.....	11	..	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Plow Brand Ammoniated Fertilizer.....	8	2	2
Etiwan Soluble Bone with Potash.....	10	..	3
Etiwan Cotton Compound.....	8	3	3
Etiwan Ammoniated Fertilizer.....	8	2	2
Etiwan Superior Cotton Fertilizer.....	8	4	6
Etiwan High Grade Acid Phosphate.....	14	..	..
Etiwan Dissolved Bone.....	13	..	..
Etiwan Ammoniated Dissolved Bone.....	8.65	2	2
Etiwan Potash Bone.....	10	..	4
Etiwan Special Potash Mixture.....	8	..	4
Etiwan Acid Phosphate with Potash.....	11	..	1
Etiwan High Grade Cotton Fertilizer.....	8	3	2
Etiwan Blood and Bone Guano.....	8	2.50	1
Diamond Soluble Bone.....	13	..	..
Diamond Soluble Bone with Potash.....	10	..	2
XX Acid Phosphate with Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
<i>Eureka Fertilizer Co., Perryville, Md.—</i>			
Potato Special	8	2.50	3
Camden Special	6	5	7
Alkaline Bone and Potash.....	10	..	2
Farmers' Favorite Bone Phosphate.....	8	2	2
Seven Per Cent Trucker.....	7	7	7
5 Per Cent Alkaline Bone and Potash.....	12	..	5
<i>Fairforest Oil Mill, Fairforest, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Fremont Oil Mill Co., Fremont, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Farmers Cotton Oil Co., Wilson, N. C.—</i>			
Dean's Special Guano.....	8	4.50	7
Golden Gem Guano.....	8	3	3
Planter's Friend Guano.....	8	2.50	3
Carolina Choice Tobacco Guano.....	8	2.50	3
Wilson High Grade Guano.....	8	2.75	2
Farmer's Special Guano.....	8	2	2
Crop King Guano.....	8	2	2
XTra Good Bone and Potash.....	10	..	2
Regal Acid Phosphate.....	12	..	..
Contentnea Acid Phosphate.....	13	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Bonum Acid Phosphate.....	14	..	..
J. D. Farrior's Special Guano for Cotton and Tobacco	8	3	3
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Cotton-seed Meal .....	..	7.50	..
Cotton-seed Meal .....	..	8	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Perfect Top Dresser for all Crops.....	2	10	5
<i>Farmers Guano Co., Raleigh, N. C.—</i>			
State Standard Guano.....	8	2	2
Toco Tobacco Guano.....	8	2.50	3
Big Crop Guano.....	8	2.50	3
Golden Grade Guano.....	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Century Bone and Potash Mixture.....	10	..	2
Farmers' High Grade Acid Phosphate.....	13	..	..
16 Per Cent Acid Phosphate.....	16	..	..
14 Per Cent Acid Phosphate.....	14	..	..
<i>W. S. Farmer & Co., Baltimore, Md.—</i>			
Dissolved South Carolina Bone.....	14	..	..
Fish Mixture	8	2	2
Kainit .....	..	..	12
Anne Arundel Trucker.....	7	4.50	8
Top Dresser	5	5	5
Hawkeye	8	3	3
Clyde Brand	8	2	1
Truckers' Compound	8	3	4
Tampico	7	5	5
Strawberry Mixture	9	5	5
W. S. Farmer & Co.'s Standard Phosphate.....	10	2.50	2.50
<i>Griffith & Boyd, Baltimore, Md.—</i>			
Accomac Trucker.....	6	5	7
Spring Crop Grower.....	6.50	2	4.50
Nitro Crop Feeder.....	9	2.50	..
Double Strength Tobacco Grower.....	8	3	3
Vegetable Bone	8	3	7
7 Per Cent Guano.....	5	7	5
Stable Manure Substitute.....	5	3.50	4
Ammoniated Bone Phosphate.....	8	2	..
High Grade Acid Phosphate.....	12	..	..
Genuine German Kainit.....	..	..	12
<i>The Home Fertilizer Chemical Works, Baltimore, Md.—</i>			
Boykin's Home Potato Grower.....	6	4	4
Cerealite Top Dressing.....	..	9	2.50
Boykin's Vegetable Fertilizer.....	6	5	6
Phoenix Crop Grower.....	8	3	2
Boykin's Cereal Fertilizer.....	8	2	2
Boykin's Dissolved Animal Bone.....	12	2	..
Yancey's Formula for Yellow Leaf Tobacco.....	8	3	2
Boykin's Alkaline Bone.....	10	..	2
Boykin's High Grade Acid Phosphate.....	14	..	..
Home Fertilizer .....	..	7	7
Boykin's Royal Potato Fertilizer.....	6	7	5
German Kainit .....	..	..	12
Nitrate of Soda .....	..	19	..
Muriate of Potash .....	..	..	50
Sulphate Ammonia .....	..	25	..
Boykin's Excelsior Acid Phosphate.....	16	..	..
<i>Hardison Co., Wadesboro, N. C.—</i>			
Genuine German Kainit.....	..	..	12
Nitrate of Soda .....	..	18	..
<i>S. B. Harrell & Co., Norfolk, Va.—</i>			
Harrell's Truck Guano.....	6	7	5
Harrell's Champion Cotton and Peanut Grower..	8	2	2
Harrell's Acid Phosphate.....	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Hadley, Harris & Co., Wilson, N. C.—</i>			
Hadley's Boss Guano.....	8	2.75	2.50
John Hadley's Special H. G. Plant Food.....	8	2	2
Daisy Guano	8	2	2
<i>Hall & Pearsall, Wilmington, N. C.—</i>			
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
<i>The Hampton Guano Co., Norfolk, Va.—</i>			
Dauntless Potash Mixture.....	10	..	2
Supreme Acid Phosphate 16 Per Cent.....	16	..	..
Hampton Crop Grower.....	10	..	4
Hampton Bone and Potash Mixture.....	11	..	2
Hampton Acid Phosphate.....	14	..	..
Hampton Ammoniated Superphosphate.....	8	2	1
Alpha Crop Grower.....	8.50	2.50	2.50
Shirley Superphosphate	8	2	2
Arlington Animal Bone Fertilizer.....	9	2.25	4
Little's Favorite Crop Grower.....	7	4	4
P. P. P. Princess Prolific Producer.....	8	3	3
Reliance Truck Guano.....	7	5	5
Virginia Truck Grower.....	6	7	5
Hampton Tobacco Guano.....	8	3	3
Hampton Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
<i>The Hubbard Fertilizer Co., Baltimore, Md.—</i>			
Hubbard's Trucker's 7 Per Cent Royal Seal Com- pound	6	7	5
Hubbard's Trucker's 10 Per Cent Guano.....	4	10	4
Hubbard's Jersey Trucker.....	8	2	10
Hubbard's 5 Per Cent Truck Guano.....	6	5	5
Hubbard's Yellow Wrapper Guano.....	8	3	3
Hubbard's Standard Bone Superphosphate.....	8	2	3
Hubbard's Soluble Bone and Potash.....	10	..	2
Hubbard's Royal Ensign.....	8	3	4
Hubbard's Exchange Guano.....	8	2	2
Hubbard's Special Mixture of Bone and Potash...	10	..	4
Hubbard's H. G. Soluble Tennessee Phosphate...	14	..	..
German Kainit .....	..	..	12
Lang's Favorite	8	2.50	3
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial X. L. O. for Cotton.....	8	3	3
Imperial Tobacco Guano	8	3	3
Imperial Cubanola Tobacco Guano.....	4	3	5
Imperial Champion Guano.....	8	2	2
Imperial Peanut and Corn Guano.....	8	2	2
Imperial Cisco Soluble Guano.....	8	2	2
Imperial 10 Per Cent Guano.....	5	10	2.50
Imperial Standard Premium Guano.....	8	2	1.50
Imperial 5-6-7 Potato	6	5	7
Imperial Special 7 Per Cent for Potatoes and Early Truck	5	7	5
Imperial Laughinghouse Special Tobacco Guano..	4	4	6
Imperial Cotton Grower.....	8	2	1.50
Imperial Martin County Special Guano.....	9	2.75	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Imperial High Grade Irish Potato.....	7	5	8
Imperial Williams' Special Potato.....	6	5	5
Imperial Fish and Bone Guano.....	6	4	4
Imperial H. G. Acid Phosphate.....	14	..	..
Imperial H. G. Tennessee Acid Phosphate.....	16	..	..
Imperial Guano for Bright Tobacco.....	8	2.50	3
Imperial Bone and Potash.....	10	..	2
Imperial German Kainit .....	..	..	12
Asparagus Mixture .....	..	6.50	7
Imperial Great Grain Grower for Wheat, Corn and Oats	10	..	3
Imperial General Crop Grower.....	8	2	1
Imperial Best Bone and Potash.....	10	..	4
Imperial 13 Per Cent Acid Phosphate.....	13	..	..
Imperial Top Dresser for Cotton.....	9	2.50	2
<i>Jonesville Oil Mill, Jonesville, S. C.—</i>			
Cotton-seed Meal .....	..	8	..
<i>Ketcham Fish and Fertilizer Co., Manteo, N. C.—</i>			
Ketcham's Fish Extract for Potatoes.....	5	4	5
Ketcham's Standard Corn Grower.....	5	6	3
<i>Lister's Agricultural Chemical Works, Newark, N. J.—</i>			
Lister's Standard Bone Superphosphate of Lime..	9	2	2
Lister's Ammoniated Dissolved Bone Fertilizer...	8	2.50	2
Lister's Success Fertilizer.....	8	2	2
<i>Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Louisburg Cotton Oil Co., Louisburg, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Laurinburg Oil Co., Laurinburg, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>A. S. Lee & Sons Co., Richmond, Va.—</i>			
Lee's High Grade Bone and Potash.....	9	..	4
Lee's Special Wheat Fertilizer.....	8	..	2
Lee's Prepared Agricultural Lime.....	..	..	2
Lee's German Fruit Grower.....	4	3	6
Lee's Plant Bed Fertilizer.....	8	2	2
Lee's Special Corn Fertilizer.....	8	..	2
Lee's Rice Grower	8	..	3
Imported Thomas' Basic Slag.....	16	..	..
<i>E. H. & J. A. Meadows Co., New Bern, N. C.—</i>			
Meadows' Diamond Acid Phosphate.....	14	..	..
Meadows' Great Cabbage Guano.....	7	7	7
Meadows' All Crop Guano.....	8	2.50	2.50
Meadows' Great Potato Guano.....	7	5	8
Meadows' Labos Guano	8	5	5
Meadows' Cotton Guano	8	2	2
Meadows' 10 Per Cent Ammoniated Guano.....	6	10	2.50
Meadows' Sea Bird Guano.....	9	4	2.50
Meadows' Roanoke Guano.....	8	2.50	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Meadows' Gold Leaf Tobacco Guano.....	8	3	3
Meadows' Genuine German Kainit.....	..	..	12
Dixon's Cotton Guano	8	2	2
Dixon's High Grade Tobacco Guano.....	8	3	3

The D. B. Martin Co., Philadelphia, Pa.—

Martin's Claremont Vegetable Grower.....	7	3	5
Martin's Bull Head Fertilizer.....	8	3	3
Martin's Carolina Cotton Fertilizer.....	8	2	2
Martin's Early Truck and Vegetable Grower....	6	4	8
Pure Dissolved Bone.....	12	2	..
Martin's Pure Ground Bone..... (Total)	22.90	2	..
Martin's Pure Raw Bone Meal..... (Total)	21.00	4.50	..
Martin's High Grade Kainit.....	..	..	12
Martin's Acid Phosphate.....	14	..	..
Martin's Potash and Soluble Bone.....	12	..	3
Potash and Soluble Bone.....	12	..	5
Potash and Soluble Bone.....	10	..	4
Potash and Soluble Bone.....	10	..	2
Acid Phosphate	13	..	..

Thos. Meehan & Sons, Germantown, Philadelphia, Pa.—

Meehan's Canada Hardwood Ashes.....	..	5.32	..
Meehan's Bone Meal..... (Total)	20.93	3.50	..

The Miller Fertilizer Co., Baltimore, Md.—

Special Tobacco Grower.....	8	2	4
Standard Phosphate	8	3	3
Miller's Irish Potato.....	8	4	4
Ammoniated Dissolved Bone.....	8	2	2
High Grade Potato.....	6	5	7
Tobacco King	8	3	3
Standard Potato	8	2	2
Potato and Vegetable Grower.....	8	2	4
Cotton Queen	8	2	1
Trucker	8	5	5
S. C. Rock	14	..	..
Grain and Grass Grower.....	8	2	1
Profit	8	2	2
Potash Mixture	10	..	4
Farmer's Profit	8	2	2
Corn and Peanut Grower.....	10.50	..	2.25
Harmony	8	2.50	3
Clinch	10	..	2
Kainit .....	..	..	12
Miller's 7 Per Cent.....	7	7	7
Miller's 16 Per Cent Acid Phosphate.....	16	..	..
Four Per Cent Tobacco.....	8	4	4
No. 1 Potato and Vegetable Grower.....	8	4.50	7

Marsh-Lee Co., Marshville, N. C.—

Marsh's Special High Grade for all Crops.....	8	3	3
Marsh's Guano for Corn.....	8	2	2
Marsh's Cotton Fertilizer.....	8	2	2

*The Mapes Formula and Peruvian Guano Co.,
New York.—*

The Mapes Corn Manure.....	8	3	6
The Mapes Economic Potato Manure.....	4	4	8
The Mapes Complete Manure "A" Brand.....	10	3	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
The Mapes Soluble Potato Manure.....	2	7	5
The Mapes Vegetable Manure or Complete Manure for Light Soils.....	6	6	6
<i>The MacMurphy Co., Charleston, S. C.—</i>			
Special 9-3-3 Guano.....	9	3	3
Special 8-5-7 Guano.....	8	5	7
Special 8-3-3 Cotton and Corn Guano.....	8	3	3
Standard 8-2½-1 Cotton Guano.....	8	2.50	1
Doubly Ammoniated Truck Farmers' Special Guano	8	8	4
Truck Farmers' Special Guano.....	10	4	4
Special 8-4-4 Tobacco Guano.....	8	4	4
Truckers' Special 6-5-6 Vegetable Guano.....	6	5	6
Wilcox, Gibbs & Co.'s Manipulated Guano.....	9	2.75	2
Special 8-2-2 Cotton and Corn Guano.....	8	2	2
Special 8-3-3 Tobacco Guano.....	8	3	3
Truckers' Special Potato Guano.....	7	4	5
High Grade Acid Phosphate.....	13	..	..
Acid Phosphate and Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	18	..
Sulphate of Potash.....	..	..	48
Muriate of Potash.....	..	..	48
<i>N. C. Cotton Oil Co., Charlotte, N. C.—</i>			
Majestic	8	2	2
<i>North Carolina Cotton Oil Co., Henderson, N. C.—</i>			
Pride of Vance Tobacco Fertilizer.....	9	3	3
Vance Cotton Grower.....	8	2	2
Franklin Cotton Grower.....	8	2	2
Henderson Cotton Fertilizer.....	8	2	2
Franklin Tobacco Fertilizer.....	9	3	3
Henderson Tobacco Fertilizer.....	9	3	3
Unedit Tobacco Fertilizer.....	9	3	3
<i>North Carolina Cotton Oil Co., Wilmington, N. C.—</i>			
Wilmington Special	8	2	2
Carter's Lifter	8	3	3
<i>North Carolina Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8	2.75	2
<i>Norfolk Fertilizer Co., Norfolk, Va.—</i>			
High Grade Acid Phosphate.....	14	..	..
Oriana Cotton Grower.....	8	2	2
Genuine German Kainit .....	..	..	12
C. S. M. Special Crop Grower.....	9	2.75	2
8-3-3 Cotton Grower.....	8	3	3
Tobacco Grower	8	3	3
Bone Potash	10	..	2
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
Pamlico Electric Top Dresser.....	5	10	2.50
Dunn's Standard Truck Grower.....	7	7	7
Ives' Irish Potato Guano.....	7	5	7

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Lencir Bright Leaf Tobacco Grower.....	8	3	3
Craven Bright Tobacco Guano.....	8	3	3
Craven Cotton Guano	8	2	2
Pitt's Prolific Golden Tobacco Guano.....	8	3	3
Foy's High Grade Fertilizer.....	8	3	3
Onslow Farmers' Reliance Guano.....	8	2.50	3
Jones County Premium Crop Grower.....	8	2.50	3
Greene County Standard Fertilizer.....	8	2	2
Carteret Bone and Potash.....	10	..	2
Fourteen Per Cent Acid Phosphate.....	14	..	..
Genuine German Kainit .....	..	..	12
Pot Neck Tobacco Guano.....	8	4	4
Bogue Fish Scrap.....	4	9	..
Muriate Potash .....	..	..	48
Nitrate Soda .....	..	19	..
Sulphate Ammonia .....	..	25	..
Sulphate of Potash.....	..	..	48

Navassa Guano Co., Wilmington, N. C.—

Ammoniated Soluble Navassa Guano.....	8	2.50	2
Clarendon Tobacco Guano	8	3	3
Navassa High Grade Guano.....	8	3	3
Occoneechee Tobacco Guano	8	2	2
Coree Tobacco Guano	8	4	4
Harvest King Guano.....	8	2	3
Navassa Complete Fertilizer.....	8	2	1
Navassa Cotton Grower.....	8	2	2
Navassa Cotton-seed Meal Guano.....	8	2	2
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8	3	2
Navassa Fruit Growers' Fertilizer.....	8	2	6
Navassa Grain Fertilizer.....	8	2	2
Navassa Guano for Tobacco.....	8	2.50	2
Navassa Carib Guano.....	8	3	10
Navassa Root Crop Fertilizer.....	7	5	7
Navassa Creole Guano.....	6	5	7
Navassa Special Truck Guano.....	8	4	4
Navassa Blood and Meal Mixture.....	8	3	5
Navassa Strawberry Top Dressing.....	8	2.50	4
Navassa Universal Fertilizer.....	8	2	1
Navassa 16 Per Cent Acid Phosphate.....	16	..	..
Navassa 14 Per Cent Acid Phosphate.....	14	..	..
Navassa High Grade Dissolved Bone.....	13	..	..
Navassa Acid Phosphate.....	12	..	..
Croatan Acid Phosphate	10	..	..
Harvey's Bone and Potash Mixture.....	8	..	3
Navassa Acid Phosphate with Potash.....	10	..	1
Navassa Bone and Potash.....	8.50	..	2
Navassa Dissolved Bone with Potash.....	10	..	2
Navassa Gray Land Mixture.....	12	..	4
Navassa Special Wheat Mixture.....	12	..	4
Navassa Wheat and Grass Grower.....	10	..	4
Navassa Wheat Mixture.....	10	..	2.25
Navassa Worlick's Mixture.....	8	..	2.25
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
Cotton-seed Meal .....	..	7.50	..
Nitrate of Soda.....	..	19	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>G. Ober & Sons Co., Baltimore, Md.—</i>			
Ober's Dissolved Bone Phosphate.....	14	..	..
Ober's Dissolved Bone Phosphate and Potash....	10	..	2
Ober's Acid Phosphate with Potash.....	8	..	4
Ober's Complete Fertilizer.....	6	5	6
Ober's Special Compound for Tobacco.....	8	3	3
Ober's Standard Tobacco Fertilizer.....	8	2	2
Ober's Special High Grade Fertilizer.....	9	3	3
Ober's Special Ammoniated Dissolved Bone.....	9	2	2
Ober's Special Cotton Compound.....	8	2	2
Kainit .....	..	..	12
Muriate of Potash .....	..	..	48
Nitrate of Soda .....	..	18	..
Cooper's Pungo Guano.....	8	2.50	2

Powhatan Chemical Co., Richmond, Va.—

Powhatan Trucker	7	6	5
North State Special.....	8	4	4
P. C. Co.'s Hustler.....	8	3	3
Economic Cotton Grower	9	2.75	2
White's Leaf Tobacco Grower.....	8	2.50	3
King Brand Fertilizer.....	8	2.50	3
Magic Tobacco Grower	8	2	2
Magic Special Fertilizer	8	2	2
Magic Cotton Grower.....	8	2	2
Magic Guano Mixture.....	8	2	1
Guilford Special Tobacco Fertilizer.....	9	3	6
Magic Bone and Potash Mixture.....	10	..	4
Powhatan Bone and Potash Mixture.....	8	..	4
Magic Grain and Grass Grower.....	8	..	4
Magic Peanut Grower	8	..	4
Magic Bone and Potash.....	10	..	2
Dixie Grain and Grass Grower.....	8	..	2
Magic Dissolved Bone Phosphate.....	16	..	..
Uneeda Acid Phosphate.....	15	..	..
High Grade Acid Phosphate.....	14	..	..
Powhatan Acid Phosphate	13	..	..
Virginia Dissolved Bone.....	12	..	..
Magic S. C. Phosphate.....	10	..	..
Pure Raw Bone Meal.....(Total)	20	4	..
Bone Meal	25	3	..
Pure German Kainit .....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..

Pacific Guano Co., Boston, Mass., Charleston, S. C.—

Soluble Pacific Guano	8.50	2	2
Pacific Special High Grade Fertilizer.....	8	3	3
Pacific Acid Phosphate	12

Pinetop Supply Co., Pinetop, N. C.—

Pinetop Standard	8	2	2
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Pine Level Oil Mill Co., Pine Level, N. C.—

Cotton-seed Meal	7.50	..
High Grade	8	3	3
Pine Level Mixture.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Cotton Grower	8	2	2
Olive Cotton Grower.....	8	3	3
<i>The Pocomoke Guano Co., Norfolk, Va.—</i>			
Superb Acid Phosphate 16 Per Cent.....	16	..	..
Pamlico Superphosphate	8	2	2
Peerless Acid Phosphate	14	..	..
Electric Crop Grower	8.50	2	2
Pocomoke Superphosphate	8.50	2	2
Hornthal Tobacco Guano.....	8	2	2
L. P. H. Premium.....	8	2	2
Crescent Complete Compound	8	2	2
Cinco Tobacco Guano	8.50	2.50	2.50
Monarch Tobacco Grower	8	3	3
Monticello Animal Bone Fertilizer.....	9	2.25	4
Harvey's High Grade Monarch.....	8	3	3
Faultless Ammoniated Superphosphate.....	7	4	4
Seaboard Popular Trucker	6	7	5
Standard Truck Guano.....	7	5	5
Freeman's 7 Per Cent Irish Potato Grower.....	6	7	5
Coast Line	5	10	3
Pocomoke Bone and Potash Mixture.....	10	..	4
10-2 Potash Mixture.....	10	..	2
Alkali Bone	11	..	2
Genuine German Kainit .....	..	..	12
Pure Ground Bone.....(Total)	20	4.50	..
Nitrate of Soda .....	..	19	..
Muriate of Potash.....	..	..	50
<i>Pocahontas Guano Co., Lynchburg, Va.—</i>			
Carrington's Superior Grain Compound.....	10	..	2
Carrington's Banner Brand Guano.....	8	2	2
Carrington's No. 3 Grain Grower.....	10	..	3
Carrington's S. C. Phosphate (Waukeshaw Brand),	16	..	..
Pocahontas Special Tobacco Fertilizer.....	9	3	3
High Grade 4 Per Cent Tobacco Compound (Mo- hawk King)	9	2.25	4
Yellow Tobacco Special.....	9	2	2
Standard Tobacco Guano (Old Chief Brand).....	9	2	2
Farmers' Favorite Guano (Apex Brand).....	8	3	3
Grain Special Bone and Potash New Rival Brand)	10	..	1.65
Imperial Dissolved S. C. Phosphate.....	14	..	..
Red Bear Special	8	2.50	3
Black Hawk Brand	8	2.50	2
Big Joe Brand	8	2	1
Wabash Wheat Mixture	10	..	4
Cherokee Grain Special.....	8	..	4
Pure Raw Bone Meal.....(Total)	22	4.50	..
Swann Cotton Grower	9	2	2
Spot Cash Tobacco Compound.....	8	2.50	3
Indian Truck Grower.....	8	4	4
<i>Patapsco Guano Co., Baltimore, Md.—</i>			
Patapsco Special Tobacco Mixture.....	8	2.50	3
Patapsco Guano	9.25	2.50	2
Patapsco Guano for Tobacco.....	9.25	2.50	2
Patapsco Tobacco Guano.....	9	3	3
Patapsco Trucker for Early Vegetables.....	7	5	5
Patapsco Crop Dresser.....	4	4	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Patapsco Potato Guano	6	5	7
Patapsco 7-7-7 Truck Guano.....	7	7	7
Patapsco 10-4 Potash Mixture.....	10	..	4
Patapsco High Grade Bone and Potash.....	11	..	5
Patapsco Soluble Bone and Potash.....	10	..	2
Patapsco Dissolved S. C. Phosphate.....	14	..	..
Patapsco Money Maker Guano.....	7	4.50	6
Florida Soluble Phosphate.....	16	..	..
Planters' Favorite	8	2	2
Choctaw Guano	8	3	3
Unicorn Guano	8	2.50	3
Baltimore Soluble Phosphate.....	11	..	2
Sea Gull Ammoniated Guano.....	8	2	2
Pilot Guano Special 4 Per Cent.....	10	2.50	4
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
Fine Ground Bone.....(Total)	20.61	4	..
Dried Blood .....	..	13.44	..
Ground Fish .....	..	11	..

Piedmont-Mt. Airy Guano Co., Baltimore, Md.—

Piedmont Potato Producer.....	5	3	6
Piedmont Special Truck Fertilizer.....	6	7	5
Piedmont Cultivator Brand.....	8	2	2
Piedmont Farmers' Standard	9	2	2
Piedmont Essential Tobacco Compound.....	9	2	2
Piedmont High Grade S. C. Phosphate.....	14	..	..
Piedmont High Grade Ammoniated Bone and Potash.....	8	3	3
Piedmont Special for Cotton, Corn and Peanuts... ..	8	2	2
Piedmont Special Farmers' Tobacco Guano.....	8.40	3	4
Piedmont Guano for Tobacco.....	8	2.50	3
Piedmont Farmers' High Grade Bone and Potash.....	10	..	2
Piedmont Bone and Peruvian Mixture.....	8	2	2
Piedmont Soluble Bone and Potash.....	8	..	2
Piedmont Guano for Cotton.....	8	2	1
Piedmont Early Vegetable Manure.....	6	5	7
Piedmont Special Potash Mixture.....	10	..	5
Levering's Reliable Tobacco Guano.....	8	3	3
Levering's Potashed Bone.....	10	..	4
Genuine German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	18.50	..
Privott's Standard Guano.....	8	2.50	3
High Grade Acid Phosphate.....	14	..	..
Wood's 4 Per Cent Acid Phosphate.....	14	..	..
Wood's Potato Guano.....	6	5	7
Wood's Cotton Grower.....	8	2	2
Wood's Corn Fertilizer.....	10	..	2
Piedmont Guano for all crops.....	8	2.50	3
Piedmont Fish Guano.....	8	2	2
Piedmont High Grade Truck Fertilizer.....	6	4	6
Privott's Special for Potato and Vegetables.....	8	2	6
Privott's 3-8-4 Guano.....	8	3	4

The Quinnipiac Co., New York, Charleston, S. C.—

Quinnipiac Pine Island Ammoniated Superphosphate.....	9	2.25	1
Quinnipiac Acid Phosphate.....	13	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>F. S. Royster Guano Co., Norfolk, Turboro, Columbia, and Macon, Ga.—</i>			
Farmers' Bone Fertilizer.....	8	2	2
Marlborough H. G. Cotton Grower.....	8	3	3
Special Compound.....	8	2	1
Caledonia Compound.....	8	2	1
Arrow Brand Guano.....	8	2.50	1
Royster's Meal Mixture.....	9	2.75	2
Bonanza Tobacco Guano.....	8	3	3
Orinoco Tobacco Guano.....	8	2.50	3
Special Tobacco Compound.....	8	2.50	2
Cobb's High Grade for Tobacco.....	8	5	6
Williams' Tobacco Guano.....	6	3	6
Royster's Special 10 Per Cent Truck Guano.....	5	10	3
Royster's Early Truck Guano.....	7	5	8
Royster's Special 7 Per Cent Truck Guano.....	7	7	7
Trucker's Delight.....	8	4	4
Royal Potato Guano.....	7	5	5
Ballentine's Potato Guano.....	6	7	7
Royal Special Potato Guano.....	7	5	7
Royster's Special Sweet Potato Guano.....	8	3	3
Royster's Special 8-4-3.....	8	4	3
Royster's Special Wheat Fertilizer.....	8	2	2
Tomlinson's Special.....	9	3	5
Royster's Peanut Special.....	7	..	5
Royster's Bone and Potash.....	10	..	2
Royster's 10 and 4 Bone and Potash Mixture....	10	..	4
Royster's 8 and 2 Bone and Potash Mixture.....	8	..	2
Royster's 8 and 4 Bone and Potash Mixture.....	8	..	4
Royster's Bone and Potash for Grain.....	10	..	3
Royster's H. G. 16 Per Cent Acid Phosphate....	16	..	..
Royster's 14 Per Cent Acid Phosphate.....	14	..	..
Royster's H. G. Dissolved Bone.....	13	..	..
Royster's XX Acid Phosphate.....	12	..	..
Magic Top Dressing.....	..	9	2.50
Cotton-seed Meal.....	..	7.50	..
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	48
Royster's Special.....	8	4	3
Royster's 8 and 2.25 Bone and Potash Mixture....	8	..	2.25
Royster's Best Guano.....	8	4	7
Harvey's Cabbage Guano.....	5	8	3
Royster's Complete Fertilizer.....	8	2	2
Humphries' Special for Tobacco.....	6	3.10	3.20
Williams' Special Guano.....	8	2.50	5

Read Phosphate Co., Charleston, S. C.—

Read's High Grade Acid Phosphate.....	13
Read's High Grade Cotton Grower.....	8	3	3
Read's High Grade Manipulated Guano.....	9	2	3
Read's Soluble Fish Guano.....	8	2	2
Read's Cotton Flower.....	8	2.50	1
Read's High Grade Tobacco Leaf.....	8	3	3
Read's Alkaline Bone.....	10	..	2
Read's Special Potash Mixture.....	8	..	4
Read's High Grade Dissolved Bone.....	14	..	..
Read's Bone and Potash.....	10	..	4
Genuine German Kainit.....	..	..	12

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>J. H. Roberson & Co., Robersonville, N. C.—</i>			
Roberson's Potato Grower.....	6	7	5
Roberson's Cotton Grower.....	9	2.75	2
Roberson's High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
Roberson's Bright Leaf Grower.....	8	2.50	3
<i>Richmond Guano Co., Richmond, Va.—</i>			
10 Per Cent Cabbage Guano.....	6	10	2
Special High Grade for Truck.....	7	6	5
Southern Trucker	8	5	5
Perfection Special	8	4	4
Gilt Edge Fertilizer.....	8	3	3
Carolina Cotton Grower.....	9	2.75	2
Carolina Bright Special Tobacco Fertilizer.....	8	2.75	2.50
Tip Top Fertilizer.....	8	2.50	3
Special Premium Brand for Tobacco.....	8	2.25	2.25
Special Premium Brand for Plants.....	8	2.25	2.25
Carolina Bright for Cotton.....	8	2.50	1.50
Premium Tobacco Fertilizer.....	8	2	2
Premium Brand Fertilizer.....	8	2	2
Edgecombe Cotton Grower	8	2	2
Bone Mixture	8	2	1
Clark's Special Formula.....	7	6	6
Carter's Special Tobacco Fertilizer.....	4	3	6
Saunders' Special Formula for Bright Tobacco....	9	3.50	5
Burton's Special Tobacco Fertilizer.....	9	2.50	3
Premium Bone and Potash Mixture.....	13	..	3
Rex Bone and Potash Mixture.....	10	..	4
Tip Top Bone and Potash Mixture.....	8	..	4
Winter Grain and Grass Grower.....	8	..	4
Premium Peanut Grower.....	8	..	4
Bone and Potash Mixture.....	10	..	2
Premium Grain and Grass Grower.....	8	..	2
Rex Dissolved Bone Phosphate.....	16	..	..
High Grade Acid Phosphate.....	14	..	..
High Grade Wheat and Grass Fertilizer.....	14	..	..
Premium Dissolved Bone.....	13	..	..
Dissolved S. C. Phosphate.....	12	..	..
Old Homestead Dissolved Bone.....	10	..	..
Hunter & Dunn's Dissolved Bone.....	13	..	..
Hunter & Dunn's Special Ammoniated Fertilizer..	9	3	2.25
Hunter & Dunn's Ammoniated Fertilizer.....	8	2	2
Pure Raw Bone Meal..... (Total)	20	4	..
Bone Meal	25	3	..
Pure German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
Sulphate of Ammonia.....	..	24	..
Nitrate of Soda .....	..	19	..
<i>Red Springs Trading Co., Red Springs, N. C.—</i>			
Kainit .....	..	..	12
<i>Reidsville Fertilizer Co., Reidsville, N. C.—</i>			
Lion Brand Fertilizer.....	9	3	6
Champion Guano	8	2	2
Royal Fertilizer	8	3	3
Banner Fertilizer	8	2	1
Broad Leaf Tobacco Guano.....	8	2.25	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos Acid.	Am- monia.	Potash.
Bone and Potash 10-4.....	10	..	4
Bone and Potash 8-2.....	8	..	2
<i>Rasin Monumental Co., Baltimore, Md.—</i>			
Rasin Acid Phosphate.....	14	..	..
Rasin Bone and Potash.....	10	..	2
Rasin Special Bone and Potash.....	10	..	5
Rasin Empire Guano.....	8	2	2
Rasin Dixie Guano.....	8	2	1
Rasin Gold Standard Guano.....	8	3	3
Rasin 13 Per Cent Acid Phosphate.....	13	..	..
Rasin 16 Per Cent Acid Phosphate.....	16	..	..
Rasin Acid Phosphate	14	..	..
<i>Red Springs Oil and Fertilizer Co., Red Springs, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Rocky Mount Guano Co., Rocky Mount, N. C.—</i>			
Tar River Special.....	8	2.50	3
Royal Cotton Grower.....	9	2.75	2
Eagle Guano	8	2	2
<i>Rowland Oil and Fertilizer Co., Rowland, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Roanoke Fertilizer and Chemical Co., Roanoke, Va.—</i>			
Farmer's Joy	8	2	4
<i>Oliver Smith Co., Wilmington, N. C.—</i>			
Genuine Peruvian Guano Ex. S. S. Hanseat (Total)	23	3.60	4.25
Genuine Peruvian Guano Ex. P. O. Condor (Total)	9	8.30	2
Nitrate of Soda.....	..	18	..
Genuine German Kainit.....	..	..	12
<i>Southern Cotton Oil Co., Rocky Mount, Charlotte, Fayetteville, Wilson, Tarboro, Monroe, Gastonia, Davidson, Shelby, Goldsboro, Concord, Gibson, Conetoe, N. C., Union, S. C., Spartanburg, S. C., Columbia, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Southern Exchange Co., Maxton, N. C.—</i>			
Two-Four Guano.....	7	4	4
That Big Stick Guano.....	8	3	4
Bull of the Woods Fertilizer.....	8	3	4
Jack's Best Fertilizer.....	8	3	3
Correct Cotton Compound.....	8	3	3
R. M. C. Special Crop Grower.....	8	3	3
Juicy Fruit Fertilizer.....	9	2.25	4
The Walnut Fertilizer.....	8.50	2.50	2.50
The Racer Guano.....	8	2	3
The Coon Guano.....	8	2	2
McKimmon's Special Truck Formula.....	8	5	7
Melon Grower	8	5	7
Genuine German Kalnit.....	..	..	12
Muriate of Potash.....	..	19	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The Southern Cotton Oil Co., Charlotte, Concord, David- son, Gastonia, Monroe, Shelby, N. C.—</i>			
Conqueror	8	4	4
Moon	8	3	3
Red Bull	8	2.50	2
King Bee	8.65	2	2
Magnolia	8.65	2	2
Gloria	8	2	2
First Call	8	2.50	1
Sun Rise	8	2.50	1
Gold Seal	14	..	..
Silver King	13	..	..
Genuine German Kainit.....	..	..	12
<i>Goldsboro, N. C.—</i>			
Best & Thompson's Special Cotton Grower.....	9	2.75	2
Goldsboro Oil Mill Special Cotton Grower.....	8	3	3
Goldsboro Oil Mill High Grade.....	8	2.75	2.50
Goldsboro Oil Mill Standard.....	8	2	2
Southern Cotton Oil Company Standard.....	8	2	2
Southern Cotton Oil Co.'s High Grade.....	8	2.75	2.50
Edgerton's Old Reliable.....	8	3	3
Genuine German Kainit.....	..	..	12
<i>Goldsboro, Rocky Mount, Wilson and Fayetteville, N. C.—</i>			
High Grade Acid Phosphate.....	14	..	..
Peacock	8	3	2
Conqueror Bone and Potash.....	10	..	4
Magnolia Bone and Potash.....	10	..	2
<i>Rocky Mount, N. C.—</i>			
Rocky Mount Oil Mill Standard.....	8	2	2
Rocky Mount Oil Mill High Grade.....	8	2.75	2.50
Rocky Mount Special Cotton Grower.....	8	3	3
<i>Fayetteville, N. C.—</i>			
Fayetteville Oil Mill Standard.....	8	2	2
Fayetteville Oil Mill High Grade.....	8	2.75	2.50
<i>Wilson, N. C.—</i>			
Wilson Oil Mill Standard.....	8	2	2
Wilson Oil Mill Special Cotton Grower.. ..	8	3	3
Wilson Oil Mill High Grade.....	8	2.75	2.50
<i>Swift Fertilizer Works, Atlanta, Ga.—</i>			
Swift's Blood, Bone and Potash H. G. Guano....	9.50	4	7
Swift's Special H. G. Guano.....	9.50	5	3
Swift's Corn and Cotton Grower H. G. Guano....	10	3	3
Swift's Monarch H. G. Guano.....	8	4	4
Swift's Cotton King H. G. Guano.....	9	3	2
Swift's Farmers' Favorite H. G. Guano.....	9	2	3
Swift's Eagle H. G. Guano.....	10	2	2
Swift's Golden Harvest Standard Grade Guano...	8	2	2
Swift's Red Steer Standard Grade Guano.....	8	2	2
Swift's Cotton Plant Standard Grade Guano....	9	2	1
Swift's Special H. G. Phosphate and Potash.....	12	..	6
Swift's Atlanta H. G. Phosphate and Potash.....	12	..	4
Swift's Farmers' Home H. G. Phosphate and Potash	10	..	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Swift's Plantation Standard Grade Phosphate and Potash	8	..	4
Swift's Wheat Grower Standard Phosphate and Potash	10	..	2
Swift's Field and Farm Standard Grade Phosphate and Potash	10	..	2
Swift's Special H. G. Acid Phosphate	16	..	..
Swift's Cultivator H. G. Acid Phosphate	14	..	..
Swift's Harrow H. G. Acid Phosphate	13	..	..
Swift's Chattanooga Standard Grade Acid Phosphate	12	..	..
Swift's Pioneer H. G. Tobacco Grower	8	2	4
Muriate of Potash .....	..	..	50
Genuine German Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Swift's Ruralist High Grade Guano	8	3	3
<i>Swift & Company, Chicago, Ill.—</i>			
Swift's Pure Raw Bone Meal	23	4	..
Swift's Pure Bone Meal	25	3	..
Swift's Ground Dried Blood	16	..	..
Swift's No. 1 Ground Tankage	6	10	..
<i>Spartanburg Fertilizer Co., Spartanburg, S. C.—</i>			
Buenos	8	4	4
Ottora	8	2	1
Tiger Brand Acidulated Phosphate	14	..	..
Brown's Compound	10	..	2
Potato Guano	7	3	7
Orpheus	10	..	4
Coronaka	8	2	2
West's Potash Acid	13	..	3
Tiger Brand	8	2	6
Boll Buster	9	2	2
Corn Formula	10	2	5
<i>Statesville Oil and Fertilizer Co., Statesville, N. C.—</i>			
Grasoil Ammoniated Guano	8	2	2
Redsoil Special Ammoniated Guano	9	3	..
Iredell High Grade Acid Phosphate	14	..	..
Iredell Bone and Potash	10	..	3
Pure German Kainit .....	..	..	12
<i>Tuscarora Fertilizer Co., Baltimore, Md.—</i>			
13 Per Cent Acid Phosphate	13	..	..
Acid Phosphate	14	..	..
16 Per Cent Acid Phosphate	16	..	..
17 Per Cent Acid Phosphate	17	..	..
Bone and Potash	10	..	2
Alkaline	10	..	5
Standard	8	2	2
Big Four	7	2	2
Fruit and Potash	8	2	1
King Cotton	8	2.50	1
King Cotton No. 2	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Cotton Special	8	3	3
Tobacco Special	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Manure Substitute	6	4	4
Special Trucker	8	4	4
Tuscarora Trucker	8	5	7
Animal Bone (Total)	24	3	..
Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
Tus Alkaline	10	..	4
<i>Tyger-Shoals Milling Co., Wellford, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>R. L. Upshur, Norfolk, Va.—</i>			
Upshur's Peanut Guano	8	2	2
Upshur's High Grade Acid Phosphate.....	14	..	..
Upshur's Fish Bone and Potash.....	8	2	4
Upshur's G. G. and C. Grain, Grass and Cotton Grower.....	8	2	2
Premo Cotton Guano.....	8	2	1.50
Upshur's Bone and Potash Guano.....	10	..	..
Upshur's 3-8-3 Cotton Guano.....	8	3	3
Upshur's High Grade Tobacco Guano.....	8	3	3
Upshur's 5 Per Cent Guano.....	5	5	5
Upshur's Special Truck Guano.....	7	5	8
Upshur's 7 Per Cent Potato Guano.....	5	7	5
Upshur's 7 Per Cent. Irish Potato Guano.....	6	7	5
Upshur's F. C. Farmers' Challenge Guano.....	6	7	6
Upshur's F. F. Farmers' Favorite Guano.....	7	5	6
Cotton-seed Meal Mixture.....	9	2.75	2
Genuine German Kainit.....	..	..	12
<i>Union Guano Co., Winston, N. C.—</i>			
Union Wheat Mixture.....	8	..	4
Union Perfect Cotton Grower.....	9	2.75	2
Union Mule Brand Guano.....	10	2	2
Union Waterfowl Guano.....	8	2.50	3
Union Homestead Guano.....	8	3	3
Union Standard Tobacco.....	8	2.50	2
Union Premium Guano	8	4	4
Union Truck Guano	7	4	5
Union Vegetable Compound.....	7	5	8
Union 16 Per Cent Acid Phosphate.....	16	..	..
Union 10 Per Cent Acid Phosphate.....	10	..	..
Union 12 Per Cent Acid Phosphate.....	12	..	..
Union High Grade Acid Phosphate.....	14	..	..
Union Dissolved Bone	13	..	..
Union 10-5 Bone and Potash.....	10	..	5
Union 10-6 Bone and Potash.....	10	..	6
Union 12-3 Bone and Potash.....	12	..	3
Union 12-4 Bone and Potash.....	12	..	4
Union 12-5 Bone and Potash.....	12	..	5
Union 12-6 Bone and Potash.....	12	..	6
Union Bone and Potash.....	10	..	2
Old Honesty Guano.....	8	2	2
Liberty Bell Crop Grower.....	10	..	1.50
Q. Q. Quality Quantity Guano.....	8	2	1
Victoria High Grade Tobacco Guano.....	8	3	3
Quaker Grain Mixture	10	..	4
Giant Phosphate and Potash.....	10	..	3

Name and Address of Manufacturer and Name of Brand	Avail. Phos. Acid.	Am. monia.	Potash.
Rockingham Bone and Potash.....	8.50	..	2
Genuine German Kainit.....	..	..	12
Vulcan Ammoniated Guano.....	8	2.50	1
Roseboro's Special Potash Mixture.....	12	..	6
Sunrise Soluble Bone and Potash.....	8	..	2.25
Union Potato Mixture.....	8	2	10

Virginia-Carolina Chemical Co., Richmond, Va.—

V. C. C. Co.'s Solid South.....	8	..	2.25
V. C. C. Co.'s 14 Per Cent Acid Phosphate.....	14	..	..
V. C. C. Co.'s 3 Per Cent Special C. S. M. Guano No. 3.....	8	3	2
V. C. C. Co.'s 16 Per Cent Acid Phosphate.....	16	..	..
V. C. C. Co.'s Standard Bone and Potash.....	10	..	5
V. C. C. Co.'s Special Truck Guano.....	6	5	7
V. C. C. Co.'s Formula 44.....	7	3.10	3.20
V. C. C. Co.'s Special Potash Mixture.....	10	..	4
V. C. C. Co.'s Special Crop Grower.....	12	..	3
V. C. C. Co.'s Special.....	8	4	4
V. C. C. Co.'s Invincible High Grade Fertilizer....	6	5	7
V. C. C. Co.'s High Grade Tobacco Fertilizer.....	8	3	0
V. C. C. Co.'s Lion High Grade Tobacco Fertilizer,	8	3	4
V. C. C. Co.'s Great Texas Cotton Grower Soluble Guano.....	9	3	4
Cock's Soluble Guano High Grade Ammoniated Bone.....	9	2.25	3
Adams' Special	8	3	3
Black's Best	8	3	3
Farmers' Favorite Fertilizer, C. S. M.....	8	2	2
Ajax C. S. M.....	8	2	2
Orange Grove	8	2.75	2.50
Royal Crown	8	2.75	2
Atlas Guano C. S. M.....	8	3	2.50
Wilson Standard C. S. M.....	8	2	2
Farmers' Friend Favorite Fertilizer Special.....	8.50	2	2
White Stem C. S. M.....	9	2.75	2
Special High Grade Tobacco Fertilizer C. S. M....	8	3	3
Superlative Guano C. S. M.....	8	2.50	3
Split Silk C. S. M.....	8	3	2.50
Prolific Cotton Grower.....	9	2.75	2
Plant Food	8	2	2
North State Guano C. S. M.....	8	2	1
Good Luck C. S. M.....	8	3	2.50
Blue Star C. S. M.....	8	2.50	3
Delta C. S. M.....	8	2.75	2.50
Diamond Dust C. S. M.....	8	2	2
Admiral	8	3	2.50
Winston Special for Cotton C. S. M.....	8	2	2
Sludge Acid Phosphate.....	14	..	..
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Fish Scrap .....	..	10	..
Sulphate of Potash.....	..	25	..
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	50
Nitrate of Soda.....	..	19	..
V. C. C. Co.'s Southern Cotton Grower.....	9	2.75	2
V. C. C. Co.'s Truck Crop Fertilizer.....	7	5	7
Allison & Addison's Fulton Acid Phosphate.....	14	..	..
Allison & Addison's B. P. Potash Mixture.....	10	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Allison & Addison's Standard Acid Phosphate....	12	..	..
Allison & Addison's I. X. L. Acid Phosphate.....	13	..	..
Allison & Addison's Rockets Acid Phosphate.....	10	..	..
Allison & Addison's McGavock's Special Potash Mixture	8	..	2.25
Allison & Addison's Old Hickory Guano.....	8	2	2
Allison & Addison's A. A.....	8	3	3
Allison & Addison's Anchor Brand Fertilizer....	8	2	2
Allison & Addison's Anchor Brand Tobacco Fert..	8.50	2.75	2
Allison & Addison's Star Brand Special Tobacco Manure.....	9	2.75	2
Allison & Addison's Star Brand Guano.....	8	2	1
Allison & Addison's Star Brand Vegetable Guano,	8	4.50	4
Atlantic & Va. Fert. Co.'s Our Acid Phosphate....	12	..	..
Atlantic & Va. Fert. Co.'s Valley of Virginia Phosphate.....	14	..	..
Atlantic & Va. Fert. Co.'s Eureka Acid Phosphate,	10	..	..
Atlantic & Va. Fert. Co.'s Crenshaw's Acid Phos- phate.....	13	..	..
Atlantic & Va. Fert. Co.'s Eureka Bone and Potash Compound	10	..	2
Atlantic & Va. Fert. Co.'s Carolina Truckers'....	7	7	7
Atlantic & Va. Fert. Co.'s Orient Spl. for Tobacco,	8	2	2
Atlantic & Va. Fert. Co.'s Eureka Ammon'd Bone,	8	2	2
Atlantic & Va. Fert. Co.'s Virginia Truckers.....	8	5	5
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9	2.50	2
Atlantic & Va. Fert. Co.'s Orient Complete Manure.....	8	2	1
Charlotte Oil & Fert. Co.'s Catawba Acid.....	10	..	..
Charlotte Oil & Fert. Co.'s Charlotte Dis. Bone...	12	..	..
Charlotte Oil & Fert. Co.'s Charlotte 15 Per Cent Acid Phosphate	15	..	..
Charlotte Oil & Fert. Co.'s Charlotte Acid Phos...	13	..	..
Charlotte Oil & Fert. Co.'s McCrary's Diamond Bone and Potash.....	8	..	3
Charlotte Oil & Fert. Co.'s Ten-Two Bone and Potash.....	10	..	2
Charlotte Oil & Fert. Co.'s Oliver's Perfect Wheat Grower.....	11	3	4
Charlotte Oil & Fert. Co.'s Catawba Guano B. G..	8	2	1
Charlotte Oil & Fert. Co.'s Queen of the Harvest C. S. M.....	8	2	1
Charlotte Oil & Fert. Co.'s Special 3 Per Cent Guano C. S. M.....	8	3	2
Charlotte Oil & Fert. Co.'s High Grade Special To- bacco Fertilizer	9	2.50	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano B. G.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano C. S. M.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Groom's Special To- bacco Fertilizer	8	3	4
Charlotte Oil & Fert. Co.'s King Cotton Grower...	8	2	2
Charlotte Oil & Fert. Co.'s The Leader B. G.....	8	2	2
Davie & Whittle's Owl Brand Dissolved Bone....	12	..	..
Davie & Whittle's Owl Brand Acid Phosphate....	10	..	..
Davie & Whittle's Owl Brand High Grade Phos..	13	..	..
Davie & Whittle's Owl Brand High Grade Dis- solved Bone	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Davie & Whittle's Owl Brand Acid Phosphate with Potash.....	10	..	2
Davie & Whittle's Owl Brand Guano.....	8	2	2
Davie & Whittle's Owl Brand Guano No. 2.....	8	2	1
Davie & Whittle's Owl Brand Truck Guano.....	8	6	5
Davie & Whittle's Owl Brand Special Tobacco....	9	2.50	2
Davie & Whittle's Owl Brand Guano for Tobacco,	8	3	3
Davie & Whittle's Vinco Guano.....	8	2	1
Durham Fert. Co.'s Durham Acid Phosphate.....	10	..	..
Durham Fert. Co.'s Blacksburg Dissolved Bone...	13	..	..
Durham Fert. Co.'s Standard High Grade Acid Phosphate.....	13	..	..
Durham Fert. Co.'s N. C. Farmers' Alliance Official Acid Phosphate	13	..	..
Durham Fert. Co.'s Durham H. G. Acid Phosphate,	13	..	..
Durham Fert. Co.'s Excelsior Dis. Bone Phosphate,	14	..	..
Durham Fert. Co.'s Double Bone Phosphate.....	13	..	..
Durham Fert. Co.'s Diamond Wheat Mixture.....	10	..	3
Durham Fert. Co.'s Blue Ridge Wheat Grower....	10	..	2
Durham Fert. Co.'s Standard Wheat Grower....	10	..	2
Durham Fert. Co.'s Carr's Special Wheat Grower,	8	..	4
Durham Fert. Co.'s Great Wheat and Corn Grower.....	10	..	1.50
Durham Fert. Co.'s Bone and Potash Mixture.....	10	..	2
Durham Fert. Co.'s Standard Guano.....	9	2	2
Durham Fert. Co.'s Blacksburg Soluble Guano...	8	2	2
Durham Fert. Co.'s Best Potato Manure.....	7	7	7
Durham Fert. Co.'s L. & M. Special.....	9	3	2
Durham Fert. Co.'s Progressive Farmer Guano....	8	2	1
Durham Fert. Co.'s Special Plant and Truck Fert.,	8	5	3
Durham Fert. Co.'s Golden Leaf Bright Tobacco Guano.....	8	3	3
Durham Fert. Co.'s Durham Ammo'd Fertilizer...	8	2	1
Durham Fert. Co.'s N. C. Farmers' Alliance Official Guano.....	8	2.50	3
Durham Fert. Co.'s Genuine Bone and Peruvian Guano.....	8	2	2
Durham Fert. Co.'s Gold Medal Brand Guano....	8	3	3
Durham Fert. Co.'s Raw Bone Superphosphate....	8	2.50	1.50
Durham Fert. Co.'s Genuine Bone and Peruvian Guano for Tobacco	8	2	2
Durham Fert. Co.'s Raw Bone Superphosphate for Tobacco.....	8	2.50	2
Lynchburg Guano Co.'s Golden Age Pure Bone Meal.....(Total)	20	4	..
Lynchburg Guano Co.'s Ironside Acid Phosphate..	16	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate...	12	..	..
Lynchburg Guano Co.'s Otter Brand Acid Phos...	10	..	..
Lynchburg Guano Co.'s Arvonian Acid Phosphate...	13	..	..
Lynchburg Guano Co.'s H. G. Acid Phosphate....	14	..	..
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture	10	..	4
Lynchburg Guano Co.'s Alpine Mixture.....	10	..	5
Lynchburg Guano Co.'s Dis. Bone and Potash....	10	..	2
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco	8	2	2
Lynchburg Guano Co.'s Lynchburg Soluble.....	8	2	2
Lynchburg Guano Co.'s New Era.....	8	2	1
Lynchburg Guano Co.'s Independent Standard....	8.50	2	2
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8	2.75	4
Lynchburg Guano Co.'s Bright Belt Guano.....	8	2	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Norfolk & Car. Chem. Co.'s Norfolk Reliable Acid Phosphate.....	10	..	..
Norfolk & Car. Chem. Co.'s Norfolk Best Acid Phosphate.....	13	..	..
Norfolk & Car. Chem. Co.'s Norfolk Bone and Potash.....	10	..	2
Norfolk & Car. Chem. Co.'s Crescent Brand Ammoniated Fertilizer	8	2	1
Norfolk & Car. Chem. Co.'s Cooper's Bright Tobacco Fertilizer	8	2.50	3
Norfolk & Car. Chem. Co.'s Pretlow's Champion for Peanuts, Cotton and Corn.....	8	2	1
Norfolk & Car. Chem. Co.'s Norfolk Truck and Tomato Grower	8	5	5
Norfolk & Car. Chem. Co.'s Genuine Slaughter House Bone	8	2	2
Norfolk & Car. Chem. Co.'s Genuine Slaughter House Bone, made especially for Tobacco.....	8	2.50	2
Norfolk & Car. Chem. Co.'s Bright Leaf Tobacco Grower	8	3	3
Norfolk & Car. Chem. Co.'s Amazon H. G. Manure, Old Dominion Guano Co.'s Norfolk Soluble Bone..	8	3	3
Old Dominion Guano Co.'s H. G. Bone Phos.	10	..	..
Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate	13	..	..
Old Dominion Guano Co.'s Planters' Bone and Potash Mixture	12	..	..
Old Dominion Guano Co.'s Miller's Special Wheat Mixture.....	10	..	3
Old Dominion Guano Co.'s H. G. Alkaline Bone....	8	..	4
Old Dominion Guano Co.'s Dis. Bone and Potash..	10	..	2
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano	8.50	..	2
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano	6	7	5
Old Dominion Guano Co.'s Isley's Formula of Dissolved Bone Potash and Chemical.....	7	7	7
Old Dominion Guano Co.'s Bullock's Cotton Grower	8	3	3
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	8	2	2
Old Dominion Guano Co.'s Osceola Tobacco Guano, Old Dominion Guano Co.'s Soluble Tobacco Guano, Old Dominion Guano Co.'s Soluble Guano.....	6	2	6
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer	8	2.50	3
Old Dominion Guano Co.'s Farmers' Friend Fert..	8	2	2
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano	8	2	1
Old Dominion Guano Co.'s Potato Manure.....	7	5	8
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer	8	3	3
Powers, Gibbs & Co.'s Fulp's H. G. Acid Phos....	13	..	..
Powers, Gibbs & Co.'s Cotton Brand Acid Phos...	12	..	..
Powers, Gibbs & Co.'s Almont H. G. Acid Phos....	13	..	..
Powers, Gibbs & Co.'s Almont Wheat Mixture.....	10	..	3
Powers, Gibbs & Co.'s Cotton Brand H. G. Acid Phosphate.....	13	..	..
Powers, Gibbs & Co.'s Acid Phos. and Potash.....	10	..	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Powers, Gibbs & Co.'s Dis. Bone and Potash.....	10	..	2
Powers, Gibbs & Co.'s Cotton Belt Ammo'd Guano,	8	3	2
Powers, Gibbs & Co.'s Cotton Brand Ammoniated			
Dissolved Bone	8	2	1
Powers, Gibbs & Co.'s Almont Soluble Ammo-			
niated Guano	8	2	2
Powers, Gibbs & Co.'s Powers' High Grade Ammo-			
niated Guano	8	2.50	2
Powers, Gibbs & Co.'s Eagle Island Ammo'd Guano,	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble			
Ammoniated Guano	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Standard			
Guano.....	9	3	2
Powers, Gibbs & Co.'s Carolina Golden Belt Am-			
moniated Guano for Tobacco.....	8	2.50	3
Powers, Gibbs & Co.'s Truck Farmers' Special			
Ammoniated Guano	8	4	5
Powers, Gibbs & Co.'s Old Kentucky High Grade			
Manure.....	8	3	3
Powers, Gibbs & Co.'s Gibbs' High Grade Am-			
moniated Guano	8	2.50	1
Southern Chem. Co.'s Tar Heel Acid Phosphate...	12	..	..
Southern Chem. Co.'s Horse Shoe Acid Phosphate,	10	..	..
Southern Chem. Co.'s Elkin Acid Phosphate.....	12	..	..
Southern Chem. Co.'s Chatham Acid Phosphate...	13	..	..
Southern Chem. Co.'s Click's 16 Per Cent Acid			
Phosphate.....	16	..	..
Southern Chem. Co.'s Victor High Grade Acid			
Phosphate.....	13	..	..
Southern Chem. Co.'s Comet 16 Per Cent Acid			
Phosphate.....	16	..	..
Southern Chem. Co.'s Red Cross 14 Per Cent Acid			
Phosphate.....	14	..	..
Southern Chem. Co.'s Reaper Grain Application...	12	..	3
Southern Chem. Co.'s Farmers' Pride Bone and			
Potash.....	10	..	3
Southern Chem. Co.'s Quickstep Bone and Potash,	10	..	1
Southern Chem. Co.'s Mammoth Corn Grower.....	10	..	2
Southern Chem. Co.'s Winner Grain Mixture.....	10	..	4
Southern Chem. Co.'s Winston Bone and Potash			
Compound.....	10	..	2
Southern Chem. Co.'s Mammoth Wheat and Grass			
Grower.....	10	..	2
Southern Chem. Co.'s Sun Brand Guano.....	9	2.50	5
Southern Chem. Co.'s George Washington Plant			
Bed Fertilizer for Tobacco.....	8	3	2.50
Southern Chem. Co.'s Yaddin Complete Fertilizer,	8	2	1
Southern Chem. Co.'s Pilot Ammoniated Guano			
Special for Tobacco.....	8	2.50	3
Southern Chem. Co.'s Electric Standard Guano...	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano.....	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano,...	8	2	2
Click's Special Wheat Compound.....	8	..	4
J. G. Tinsley & Co.'s Stone Wall Brand Acid Phos.,	10	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate...	14	..	..
J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	13	..	..
J. G. Tinsley & Co.'s Bone and Potash Mixture....	10	..	2
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower,	6	4	4
J. G. Tinsley & Co.'s Stone Wall Guano.....	8	2	2
J. G. Tinsley & Co.'s Lee Brand Guano.....	8	2	2
J. G. Tinsley & Co.'s 10 Per Cent Truck Guano....	5	10	2.50

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Am- monia.	Potash.
J. G. Tinsley & Co.'s Stone Wall Tobacco Guano..	8	2	2
J. G. Tinsley & Co.'s Tobacco Fertilizer.....	8	4	2.50
J. G. Tinsley & Co.'s Irish Potato Guano.....	6	6	6
J. G. Tinsley & Co.'s Richmond Brand Guano....	8	2	1
J. G. Tinsley & Co.'s Killikinnick Tobacco Mixture,	8	2.50	3
S. W. Travers Co.'s Champion Acid Phosphate....	10	..	..
S. W. Travers Co.'s Capital Dissolved S. C. Bone,	12	..	..
S. W. Travers Co.'s Standard Dissolved S. C. Bone,	13	..	..
S. W. Travers Co.'s Dissolved Bone Phosphate...	14	..	..
S. W. Travers Co.'s Special Wheat Compound....	8	..	4
S. W. Travers Co.'s Capital Bone and Potash			
Compound.....	10	..	2
S. W. Travers Co.'s Beef Blood and Bone Fert...	8	2	1
S. W. Travers Co.'s Capital Cotton Fertilizer....	8	2.50	1
S. W. Travers Co.'s Capital Truck Fertilizer....	8	4	3
S. W. Travers Co.'s Capital Tobacco Fertilizer...	8	4	3
S. W. Travers Co.'s National Spl. Tobacco Fert..	8	2	2
S. W. Travers Co.'s National Fertilizer.....	8	2	2
Va. State Fert. Co.'s Gilt Edge Brand Pure Bone			
Meal..... (Total)	20	4	..
Va. State Fert. Co.'s Lurich Acid Phosphate.....	10	..	..
Va. State Fert. Co.'s Alps Brand Acid Phosphate,	12	..	..
Va. State Fert. Co.'s Clipper Brand Acid Phos...	13	..	..
Va. State Fert. Co.'s Bull Run Acid Phosphate...	16	..	..
Va. State Fert. Co.'s Gilt Edge Brand Acid Phos...	14	..	..
Va. State Fert. Co.'s Gilt Edge Brand Dissolved			
Bone and Potash.....	8.50	..	2
Va. State Fert. Co.'s H. G. Dis. Bone and Potash,	10	..	2
Va. State Fert. Co.'s Mountain Top Bone and			
Potash.....	10	..	5
Va. State Fert. Co.'s XX Potash Mixture.....	10	..	4
Va. State Fert. Co.'s Bull Dog Soluble Guano....	8	3	3
Va. State Fert. Co.'s G. E. Spl. Tobacco Grower...	8	2.50	2
Va. State Fert. Co.'s Game Cock Special Guano...	8.50	2	2
Va. State Fert. Co.'s Battle Axe Tobacco Guano...	8	2	2
Va. State Fert. Co.'s Highland King.....	8	2	1
Va. State Fert. Co.'s No. 1 Soluble Guano.....	9	2	..
Va. State Fert. Co.'s Dunnington's Special Form-			
ula for Tobacco.....	8	3	3
Va. State Fert. Co.'s Austrian Tobacco Grower....	8	2.50	2
Va. State Fert. Co.'s Va. State High Grade To-			
bacco Guano	8	2	2
Va. State Fert. Co.'s Buffalo Guano.....	8	2.50	3
Va. State Fert. Co.'s Va. State H. G. Guano.....	8	2	2

Venable Fertilizer Co., Richmond, Va.—

Venable's 10 Per Cent Trucker.....	6	10	2
Venable's 5 Per Cent Trucker.....	8	5	5
Venable's 4 Per Cent Trucker.....	8	4	4
Venable's 6-6-6 Manure	6	6	6
Venable's Ideal Manure	8	2	5
Venable's B. B. P. Manure.....	8	2	1
Venable's Alliance Bone and Potash Mixture....	8	..	4
Venable's Peanut Grower	8	..	4
Venable's Grain and Grass Grower.....	8	..	2
Venable's Alliance Acid Phosphate.....	14	..	..
Venable's Dissolved Bone Phosphate.....	13	..	..
Venable's S. C. Bone.....	10	..	..
Venable's Roanoke Special.....	8	2.50	3
Planters' Bone Fertilizer	8	2	2
High Grade Bone and Potash Mixture.....	10	..	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Ballard's Choice Fertilizer.....	8	3	3
Roanoke Meal Mixture	9	2.75	2
Bone and Potash Mixture.....	10	..	2
Pure German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Potash .....	..	24	..
Nitrate of Soda .....	..	19	..
Pure Raw Bone Meal.....(Total)	20	4	..
Bone Meal	25	3	..
Venable's H. G. Tobacco Fertilizer.....	8	3	3
<i>Verner Oil Mill, Lattimore, N. C.—</i>			
Cotton-seed Meal .....	..	8	..
<i>Williams & Clark Fertilizer Co., New York and Charleston, S. C.—</i>			
Americus Ammoniated Bone Superphosphate.....	8	2.25	1
<i>Wilson Grocery Co., Wilson, N. C.—</i>			
Morning Glory	8	3	3
Echo	8	2.50	3
<i>W. H. Worth & Co., Greensboro, N. C.—</i>			
Standard Ammoniated Guano	8	2.50	3
Union Acid Phosphate	14	..	..
Ocala Guano	8	2	2
Worth's XXX	8	3	3
Bone and Potash Mixture.....	10	..	2
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Standard Vegetable	8	3	3
Standard Potato	8	2	5
Standard Grain and Grass Grower.....	8	2	2
High Grade Acid Phosphate.....	14	..	..
Lawn Enricher	5	3	3
Wood's Pure Animal Bone.....(Total)	23	3	..
Bone and Potash	10	..	2
<i>Winborne Guano Co., Tyner, N. C.—</i>			
Soluble Bone and Potash.....	10	..	2
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
High Grade Excelsior Guano.....	8	2	2
High Grade Eureka	8	2	2
High Grade Triumph Guano.....	8	2	2
Winborne's 7 Per Cent Guano.....	5	7	5
King Taming Guano.....	8	3	3
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Animal Bone Meal.....(Total)	20.85	4.67	..

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

THE FEEDING OF BEEF CATTLE

BY

TAIT BUTLER



MAKING BEEF.

MAY, 1906

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION

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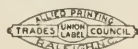
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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 5.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, MAY, 1906.

THE FEEDING OF BEEF CATTLE.

BY TAIT BUTLER.

There are at least two excellent reasons for the feeding of beef cattle on many North Carolina farms. First, there is wasted, or not fully utilized, large quantities of rough forage, notably corn stover; and there are also large quantities of cotton seed and cotton-seed meal now being used directly as fertilizers for which much better values would be obtained by first feeding them and thereby obtaining their feeding values, and also a large part of their original fertilizer values.

The second reason is found in the extreme lack of humus, or decaying organic matter, in our soils. No soils need stable manure more than ours and few receive less of it. Many of our soils are deficient in plant food, and most of the older soils are very deficient in humus, and certainly there is no better way of supplying this humus than through the application of stable manure.

In brief, the chief present objects of beef cattle feeding on North Carolina farms are to furnish a market for the products of the farm now largely wasted and at the same time retain the fertilizer value of these products for maintaining and building up soil fertility. The lack of satisfactory pastures is almost universally given as the reason for the absence of live-stock on our farms, but this cannot be given as a reason for the failure to feed to beef cattle during the winter such farm products as corn stover, cotton seed and cotton-seed meal, of which we have large quantities not now fully utilized.

The winter feeding of beef cattle is a subject concerning which more farmers are now desiring information than at any other time. In fact, probably more beef cattle were fed in North Carolina during the past winter than at any other time during recent years. In the past the feeding of beef cattle has not been uniformly or even usually successful. In a large percentage of cases where the feeds were purchased actual loss has resulted, while in others more money could

have been obtained by selling the feeding stuffs on the nearest market. But, with a proper appreciation of the necessity of feeding the products of the farm in order to maintain its fertility the feeding of cattle has become a very important question concerning which many farmers in the State desire information.

On the following pages will be found a discussion of some of the problems involved in the feeding of beef cattle in North Carolina.

FEEDERS.

The greatest difficulty in the way of successful cattle-feeding in North Carolina is the scarcity of good cattle to feed. The production of feeders is confined almost exclusively to a few counties west of the Blue Ridge, and not more than four or five of these grow many cattle for supplying more than local demands.

That part of the State sufficiently near to this cattle-raising section to enable it to obtain its feeders without the necessity of railroad shipping has a great advantage over other parts of the State; for railroad freight rates on live-stock throughout a large part of the South are almost prohibitive, and long shipments of feeders, followed by long shipments of the finished cattle to find satisfactory markets, operate to discourage and make unsuccessful the feeding of beef cattle.

Few really first-class feeders are produced in the State, but cattle of fair quality may be had from Ashe, Alleghany, Watauga and a few other of our mountain counties, at prices somewhat higher than the same grade of cattle could be bought for in Chicago or the other large markets. But those sections of the country which produce the best feeders are beyond the reach of the North Carolina farmer, because of the distance and the accompanying high freight rates. This makes the demand for such feeders of fair quality as are produced in the State greater than the supply, and enables our growers of feeders to obtain higher prices for cattle, weighed right off the grass, than shrunk cattle of the same quality could be bought for in Kansas City or Chicago. But, as before stated, our distance from the sections where large numbers of good feeders are produced and the high freight rates make it necessary that we obtain our feeders from the mountain counties of this State when such is possible. From our present knowledge and experience we would advise those living sufficiently close to our best cattle-growing mountain counties to enable them to get their feeders to their farms without railroad shipments, to buy the best grade of these mountain feeders at the best weights and price possible, rather than to feed the very low-grade stuff to be procured elsewhere in the State, unless this can be bought at an extremely low price.

Unless the prospective feeder is really a good judge of cattle he had better pay some good buyer to purchase for him the cattle he needs.

Usually some man living in the section where the cattle are to be bought can be found who will buy the cattle cheaper and get a better quality than can be done by a stranger.

If the feeding period is to be longer than ninety days the best grade of cattle obtainable will probably give the best results to the feeder, but this depends somewhat as to the market on which the finished cattle are to be sold. Good cattle not only bring a better price when finished, but if the feeding period is to be longer than three months the average daily gains will probably also be greater.

For short feeding periods the selling price of the finished cattle should be from one cent to a cent and a quarter per pound greater than the purchase price; while for longer feeding periods the difference would be from one and a quarter to one and a half cents per pound.

THE SELECTION OF FEEDERS.

The selection of feeders deserves more attention than it receives from the few in this State who buy such cattle for feeding. The writer has seen many bunches of cattle; picked up wherever they could be found, apparently without regard to their form or fitness for making beef, from which one-half might have been excluded and the net profits as the result of the feeding undoubtedly increased.

If any of us were going to sell a few tons of hay, or a hundred bushels of corn, and heard of a buyer who would give more than we could get on the regular market, we would not fail to spend considerable time, if necessary, to find the fellow who offered the higher price. Why not take as much trouble in selecting cattle to eat our grass, hay and grain? They can only be regarded as a convenient and profitable way of marketing the more bulky products of the farm, therefore we should see to it that we send our hay and grain to the best market—feed it to the best steer.

All are familiar with the fact that flesh covers many faults in cattle, especially in the eyes of the inexperienced; yet a good judge is able to pick out with considerable accuracy the cattle that will feed best and make the best beef, no matter what their state of flesh may be. However, in the opinion of the writer, buyers are more frequently deceived in the beef-making qualities of cattle when real thin in flesh than when in fairly good condition. The average seller, if he has a lot of cattle thin in flesh and of poor quality, is always ready with the old but deceptive story, "These cattle are poor, and are now seen at their worst; when put on feed tremendous gains will be made; they will fill out on the hips and the huge paunches will contract, the backs will become straight, the legs shorter, the ribs will soon be covered with thick flesh, the hair will become smooth and glossy, and the transformation will be so complete, and the objectiona-

ble points disappear so rapidly under the influence of food and care, as to make the cattle in a short time as fine a lot of feeders as can be found in the country."



FIG. 1.—A Very Unsatisfactory Feeder.

This seemingly plausible argument deceives many, but is nonsense just the same. No matter how poor cattle may be, if they lack the characteristics of beef animals—"the straight back and well-sprung ribs, the straight lower line and well-filled quarters"—they can never have their conformation changed by any quantity of feed, or by any sort of care. In fact, the scrub or dairy-bred steer, as he increases in age, departs still farther from the proper beef form. His shoulders and belly grow larger, while his back, hips and thighs seem to get thinner. He is increasing in weight to be sure, but it is in portions furnishing the cheaper cuts and in tallow on his inside and not in valuable beef over his back, loin and hips, or in his thighs. No matter what he may weigh, or how fat he may be made, he will still be a cheap scrub and bring a scrub price on the market.

The old saw, that an article well bought is half sold, is nowhere better illustrated than in the buying of cattle for feeding for beef. The question of profit or loss in the operation is as much dependent upon the judgment exercised in buying as upon any other feature of the whole business.

The points essential to a good feeder are: A deep, wide, compact body, with straight back and under line and set on short legs; long, wide and smooth hindquarters, accompanied by well-sprung ribs, giving a deep round barrel and even side lines; smooth, even shoulders, broad and level on top, and not developed in excess of hindquar-



FIG. 2.—A Pair of Satisfactory Feeders.

ters; a short, broad head with large mouth and massive, thickly-fleshed lower jaws, and attached to a short, full neck.

Those characters somewhat indefinitely described as "quality," and indicated by moderately fine hard bone, soft elastic hide and a fine

silky coat, are desirable, but what are known as good handling qualities are even more important as an index of good feeding prospects. These are an elastic skin of medium thickness, rather loosely covering even, mellow flesh. This, of course, is influenced very considerably by the condition of flesh and care; still, an animal with a hard skin tightly drawn over his bones is not likely to make a very profitable feeder. Other characters to be avoided in the feeder are: A long



FIG. 3.—A Very Satisfactory Feeder.

narrow head, a slim neck, long coarse legs, with large rough joints, light flanks, small heart girth, rough open shoulders and coarse, harsh hair.

It is not expected that an animal thin in flesh will present the same even surface and straight lines of the animal in better flesh, but the general form and frame should be such that flesh rather evenly

laid on will produce the smooth plump form essential to good beef making.

It may also be stated that a young animal in fair flesh and of a quiet or mild disposition is always more desirable than a real thin, wild or nervous old one. Of course, when first put on to full feed, the thinner and older animal may make more rapid gains, but these are frequently obtained at a greater expense for feed and may not be maintained for very long periods.

THE AGE OF FEEDERS.

In the South few cattle are fattened and marketed for beef before they are three or four years old. They are run on ordinary short pastures during the summer and "roughed" through the winter on coarse forage with but little grain. At three or more years old they are fed liberally, if not always judiciously, for a short period of about three months and then marketed. It is not possible to produce cattle in this way that will "top the market," and they consequently sell for much below the price of first-class cattle. While money is undoubtedly made out of cattle by this method, it would probably pay better to give them a little more feed and care while young, begin fattening at a little younger age and continue it for a little longer period. By such a change the quality of the cattle would be very greatly improved and the resulting higher price would pay for the extra care and feed.

There are also other very important reasons why it pays to push the growth while young and finish before the animals get too old. Two of these are: The rate of gain per day decreases with age and the cost of gain per pound increases with age and the length of the fattening period.

It will be readily appreciated how important the age, size and length of the fattening period are, in determining results of feeding operations, when we show, by a few figures, how largely they influence the cost of a given amount of gain. For instance, records of the animals exhibited at the American Fat Stock Shows, as compiled by Stewart, and given in Henry's "Feeds and Feeding," show that—

30 animals up to	297	days made an average daily gain of 2.63 pounds.
152 " " "	612 " " "	" " " 2.18 "
145 " " "	943 " " "	" " " 1.74 "
133 " " "	1,283 " " "	" " " 1.51 "

Or, by periods, which show the fact more clearly, the results are as follows:

First period of 297 days the daily gain was 2.63 pounds.
Second " " 315 " " " " " 1.76 "
Third " " 331 " " " " " .92 "
Fourth " " 340 " " " " " .88 "

It will be seen that animals only 297 days old had made an average daily gain of 2.63 pounds; whereas, animals 1,283 days old had only averaged a gain of 1.51 pounds per day, and during the last 340 days of their life had only gained .88 of a pound per day.

As the rate of gain per day decreases the cost increases, as we would naturally suppose. On this point Curtis says:

"There is a difference of from 15 to 25 per cent in producing a pound of beef on a steer three years old and one finished at fifteen or eighteen months; that is a well-established principle, and applies to hogs and sheep as well as to cattle." Henry, in "Feeds and Feeding," says the cost of making a pound of gain is about double the second year what it was the first, and about three times the third year what it was the first; or, to be more definite: "At the Fat Stock Show for 1882 the feed for 100 pounds of gain for steers up to 12 months cost \$4.03; between 12 and 24 months it was \$7.98; while between 24 and 36 months the cost reached \$12.54."

The reasons for the decrease in the rate of gain per day and increase in the cost per pound with age are: First, a young animal will eat more in proportion to his weight than an old one, and, second, the larger the animal the more food he must eat to merely support or keep alive his body before he can devote anything to growth or laying on fat. The food necessary to support the animal body without gain or loss is known as a "maintenance ration," and as this, of course, increases with the size of the animal, the cost of gain must also increase, because a young animal only requiring 5 pounds of feed for the support of his body only has to charge his owner up with 5 pounds of feed before he begins converting the balance of his ration into meat, but a larger animal requiring 15 pounds of feed for the mere support of his body must charge up three times as much against his owner before crediting him with any increase in weight.

From this, the importance of early maturity and good feeding from birth to the block will be plainly seen, but it does not follow that where pastures are extensive and coarse feeds cheap, money may not be made by merely growing steers up to three years old and then fattening them.

By merely growing steers up to two or three years old, is not meant barely feeding enough to sustain life. It will never pay to allow a steer to lose flesh or weight. He should be kept growing all the time, enough grain being fed when the pastures are short, and during the winter, to maintain the body weight and supply something besides for growth. In many cases the conditions are such, in the South, as to render this plan preferable to the forcing system. However, the best quality of beef and usually the most money is made by forcing with an abundance of rich food from birth to the block.

Where lands are cheap the ideal way to procure feeders is to raise them, but for a long time to come the increasing number throughout

the central and eastern parts of the State, who desire to feed cattle, will have to depend on the purchase of their feeders from other sections. The mountain sections of our State are well adapted to the production of feeders and stockers, but it is a pity that more attention is not given to the introduction of high-class, pure-bred sires, and a little better care and more feed given the young cattle during the winter. Of course, in some sections a few pure-bred sires are used, but by far too many grade bulls are in use to insure a certain and rapid improvement of the quality of the feeders produced. Nothing but pure-bred sires should be used on grade cows. No grade is good enough for this purpose, because his breeding is not sufficiently pure and fixed to enable him to stamp his good form on his progeny, when he is bred to grade cows, with the same admixture of scrub blood, or on native cows of no particular breeding.

FEEDS AVAILABLE.

Of course, a large number of feeds may be purchased, but the prices of most of these prevent their use in profitable beef cattle feeding. Moreover, the object should be to produce on the farm, in so far as it is practicable, all the feeds to be used in the feeding of the cattle. In short, the feeds to be used, whether they be produced on the farm or purchased, must be obtained at a cost which will permit of their use under the ruling prices for feeders and finished cattle. Bearing these limitations in mind, what are the feeding-stuffs available for profitable beef cattle feeding in North Carolina?

It must be apparent that the long forage or roughage should be produced on the farm, for in the production of such feeding-stuffs the South should excel, because of the long growing season and the resulting opportunity for the production of two crops on the same land during one season.

Of the feeds which, it seems to the writer, are certainly available for the purpose of beef cattle feeding, the following constitute practically the entire list:

ROUGHAGE.

Corn stover (shredded).
Silage.

CONCENTRATES.

Cotton seed,
Cotton-seed meal.

To the rough feeds named may, under certain conditions, be added the following:

Cotton-seed hulls,

Peavine, sorghum, and other home-grown hays.

To the concentrates named it may be profitable in certain cases to add a small quantity of corn, or corn and cob meal, but this is extremely doubtful.

This does not afford us a very large variety of feeding-stuffs, and yet it is quite practicable to feed cattle for from four to six months on corn stover, silage, cotton seed and cotton-seed meal with quite satisfactory results both as regards the daily gains made by the cattle and the financial returns from the operation.

This question of the proper selection of feeding-stuffs is such an important one, as related to the financial results of feeding operations, that it may be well to consider it more in detail.

CORN STOVER.

Thousands of tons of corn stover are wasted every year in this State which might be used profitably in the feeding of beef cattle, not to mention the fact that this wasted corn stover would make an excellent substitute for the thousands of tons of timothy hay now purchased at from \$15 to \$20 per ton.

Nearly half the feeding value of the corn plant is in the stover—leaves, stalks and shucks—and of that half we save only about 40 per cent in the leaves and shucks. If the remaining 60 per cent of the stover, or 30 per cent of the entire plant, represented the total loss caused by the common method of harvesting the corn crop, it would be bad enough to merit attention; but the custom of “fodder-pulling” decreases the yield of shelled corn enough to nearly equal the value of the fodder obtained. (See October, 1905, BULLETIN, N. C. Department of Agriculture). It therefore follows that the usual method of harvesting the corn crop wastes nearly one-half its feeding value and deprives us of an excellent form of rough forage for cattle-feeding.

An acre of corn, of an average variety, that will yield twenty-five bushels, will produce about a ton of stover. Such an acre of corn can be harvested—cut, shocked, hauled to the barn and shredded—for a total cost of not to exceed \$3.00 per acre, and therefore, since most of the corn raised in the State is now harvested in such a way as to waste this stover, we have no right to count its cost to the farmer who saves it for cattle-feeding at a higher figure than \$3.00 per ton.

At this price, or even at \$5.00 per ton, it is the cheapest dry, rough forage available on most farms.

During the past winter the Department fed a car-load of steers for 140 days that had no other roughage than shredded corn stover. One lot of five steers out of this car-load made an average gain of over two pounds each, per day, for the last three months of the feeding period; and the whole lot of 27 head made an average daily gain for the entire feeding period of 1.5 pounds. The weights from which these gains are reckoned are the purchasing weight obtained as the cattle were taken right off the grass and the actual selling weight. Had the weight of these cattle on the day they were first put on feed, and after they had been driven a distance of fifty miles, been taken for the initial weight, the daily gain would have appeared much greater.

These cattle received about 30 pounds of shredded stover per day, and ate about 88 per cent of it; that is, they wasted only about 12 pounds out of every one hundred, which was not more than enough for bedding.

Soule of Virginia, in Bulletin No. 2, Vol. XIV, in giving the results of an experiment to test the comparative value of silage, corn stover and timothy hay in beef cattle feeding, states that "Stover can often be utilized as a roughness for the winter feeding of beef cattle to much greater advantage than is generally believed to be the case. In other words, the very expensive timothy hay which is now frequently utilized and adds so much to the cost of the winter feeding of beef cattle might be sold off the farm and its place taken, first, by silage, or, in the event that necessary equipment for the harvesting and preservation of the crop in that form is not available, in the form of good shredded stover or corn fodder. Were this fact more generally known and appreciated, it would solve many of the difficulties with which some of our farmers are confronted."

The results of those experiments which have been most unfavorable to shredded stover indicate that, including waste and every other defect, two pounds of shredded corn stover are superior to one pound of the best grass hay; while the weight of evidence shows that, pound for pound, what is eaten by the cattle is only a little if any inferior to the average grass hays produced in this State. In the light of this evidence it is inexplicable why the bulk of our corn stover is still allowed to waste in the fields while we continue to import thousands of tons of hay, and to pay \$6.00 a ton for cotton-seed hulls, to feed to cattle.

SILAGE.

Silage has been little used for the feeding of beef cattle in this State, but experiments in Canada, Wisconsin, Texas, Tennessee, Virginia and elsewhere indicate that its judicious use produces faster and cheaper gains and results in a finished animal that commands a higher price on any discriminating market.

The silo furnishes the means by which the largest percentage of the feed value of a crop can be saved for the winter feeding of beef cattle; but this is not its chief value to the feeders of beef cattle. It is a well known fact that succulence adds to the value of a ration, and that this is especially so when the ration lacks variety. If corn stover, cotton seed and cotton-seed meal are the only other feeds sufficiently cheap to permit of being generally used in the feeding of beef cattle in this State, then the value of silage becomes greatly enhanced because of the succulence it adds to this ration which is otherwise deficient in variety.

Soule of Virginia, in the experiments previously referred to, found that "the silage-fed cattle made much larger gains, showed

more quality at the end of the feeding trial, and in any discriminating market would have brought a considerably higher price than the other animals."

The average daily gains made by the cattle fed by Soule were as follows:

Those fed silage.....	1.46 pounds.
Those fed timothy hay.....	1.10 pounds.
Those fed corn stover.....	.97 pounds.

For every pound of gain made the silage-fed cattle consumed 7.19 pounds of grain, the hay-fed cattle 9.45 pounds, and the stover-fed cattle 10.72 pounds. "The cost of a pound of gain with the silage-fed cattle was 9.04 cents; with the stover-fed cattle 13.20 cents, and with the hay-fed cattle, 14.27 cents.

In the opinion of Soule, these results do not overrate the value of silage for beef production.

Those who contemplate the feeding of beef cattle in as large numbers as ear-load lots cannot afford to be without a silo, for the succulence furnished by silage is essential to the best results in winter feeding. With good land near the silo, silage should be put in at a cost of from \$1.00 to \$1.50 per ton, and Soule, in the experiment referred to above, found that 20.65 pounds of silage was consumed for every pound of gain; 11.15 pounds of stover and 11.24 pounds of hay, and as already stated, more grain was required with the dry feeds for every pound of gain.

If these figures represent facts, and they probably do not overrate the value of silage, especially when fed with a proper amount of dry roughage, we have in shredded corn stover as shown by our own experiments, and in silage, as shown by the experience of others, two very cheap and excellent forms of roughage for the feeding of beef cattle. Either fed alone do not give the best results, but when combined we have all the rough forage necessary for the most successful feeding of beef cattle.

COTTON-SEED HULLS.

Money has been made by feeding beef cattle with cotton-seed hulls as roughage, but while a ton of stover can be harvested for \$3.00 and a ton of silage put in the silo for \$1.50, and one ton of the former or two tons of the latter is superior to a ton of hulls, which cannot be bought for less than \$5.00, it is no longer economy to purchase cotton-seed hulls and permit the corn stover to rot in the fields.

It is probably true that cotton-seed hulls have a value apart from the actual nutrients which they contain, when fed with a highly concentrated nitrogenous feed like cotton-seed meal. Cattle require coarse, bulky feeds, and it is necessary to mix something loose and bulky with the heavy, compact cotton-seed meal. Hulls serve admira-

bly for this purpose, and when they sold for as low as \$3.00 per ton they made an excellent cheap roughage, but at the higher prices now charged for hulls their place may usually be taken by other feeds with more profitable results. At least, when silage and shredded stover are to be had at the low cost which is practicable on every farm, not more than from 3 to 5 pounds of cotton-seed hulls need be used at the most, and these only for the purpose of diluting and giving greater bulk to the cotton-seed meal.

No doubt cotton-seed hulls and meal may be fed for short periods at present prices, and a profit made by the operation in certain cases; but better and more economical results may be obtained from the use of shredded corn stover and silage, especially when the feeding period exceeds 100 days.

PEAVINE AND OTHER HAYS.

It is doubtful if any salable hay can be profitably fed to beef cattle in North Carolina. This is certainly the case when the hay is near enough to the railroad to make its shipment practicable, for the price of hay ranges from \$12 to \$20 per ton, and that is too high for profitable cattle-feeding. However, if we count the actual cost of production, instead of the selling price, of peavine hay, and then deduct from this cost of production the value of the stubble and roots in the improvement of the land, we can better afford to grow it and feed it to beef cattle rather than not grow it at all; but at ruling market prices all salable hays are too high-priced for the profitable feeding of beef cattle.

CONCENTRATES OR GRAINS.

With the exception of cotton seed and cotton-seed meal all grains or concentrates are high-priced to the North Carolina cattle-feeder. Corn, rice products, wheat bran, linseed meal, gluten feeds, etc., are all too high-priced to permit of their use, except in very small quantities.

COTTON SEED.

At the usual market price cotton seed is the cheapest cattle feed available in the cotton-producing sections of this State. But the high fat content of cotton seed prevents its use to an extent approaching a full ration. In small quantities cotton seed is, pound for pound, equal in feeding value to corn. Or, in other words, cotton seed at 25 cents per bushel is as cheap for cattle feeding as corn at 40 cents per bushel, or cotton-seed meal at \$25 per ton. Therefore, since cotton-seed meal and corn seldom sell below the prices stated and cotton seed may usually be bought at less than 25 cents per bushel or \$16.66 per ton, it follows that cotton seed should be fed to the extent of from 4 to 6 pounds per day to a steer weighing 1,000 pounds. In larger

quantities it is likely to produce scouring, which all practical feeders know is fatal to profitable feeding.

If the cattle are receiving an abundance of dry roughage slightly larger quantities of cotton seed may frequently be used to advantage, but as a general rule we would not advise the use of more than 5 or 6 pounds per day to a steer weighing 800 to 1,000 pounds.

At present most of the seed produced in North Carolina is put in the ground direct, as fertilizer, or disposed of to the oil mills at an average of not over \$15 per ton.

At current prices for commercial fertilizers a ton of seed is worth about \$15 when put in the ground direct. When fed to cattle it is worth \$16.66, if corn is worth 40 cents per bushel. But when fed, at least two-thirds of its original fertilizer value, or \$10.00 worth of plant food, is obtained in the stable manure, so a ton of cotton seed, when fed on the farm, has a total value of not less than \$25. It is, therefore, evident that no cotton seed should leave the farm for less than from \$25 to \$30 per ton. At any lower price all the seed should be fed to cattle.

COTTON-SEED MEAL.

Everything considered, we probably possess in cotton-seed meal the best, because the cheapest, cattle feed known to the cattle-feeding world. Therefore, the grain ration for beef cattle should be so compounded as to permit of the use of the largest possible amount of this feed. In fact, in practical commercial feeding the concentrated feed must be largely, if not entirely, made up of cotton-seed meal and cotton seed. A ration such as this, which lacks variety, is very much improved by succulence in some form, and for this reason silage is especially valuable in the feeding of beef cattle when cotton-seed products constitute the greater part of the grain ration. Considerations of economy make it necessary to feed larger quantities of cotton-seed meal than the accepted scientific principles of feeding would permit, but by the use of corn stover and silage for roughness, which furnish succulence and a large amount of carbohydrates, the greater part of the concentrates may be made up of cotton-seed meal with safety and economy.

Thousands of tons of cotton-seed meal are put into the soil of North Carolina every year, either as pure meal or in commercial fertilizers. When thus used it has a value of not far from \$25 per ton. When fed to cattle it is worth \$25 per ton if corn is worth 40 cents per bushel, for a pound of cotton-seed meal is worth a pound and three-quarters of corn for cattle-feeding. But when a ton of cotton-seed meal is fed, at least \$16 worth of plant food may be obtained in the manure, which, added to the feeding value, which is not less than \$25, makes the real value of a ton of cotton-seed meal fed on the farm not less than \$41. So long as we buy commercial fertilizers, nearly every ton of which contains from 500 to 800 pounds of cotton-seed

meal, and put large quantities of pure meal in the ground direct, as fertilizer, there will be reason for the feeding of beef cattle on our farms.

If the feeding period is to be a short one, say not to exceed 100 days, large quantities of cotton-seed meal may be used in connection with corn stover and corn silage with comparative safety, as much as 6, 8 or even 10 pounds per day to a 1,000-pound steer; but if the feeding period is to be of much longer duration the amount of meal should probably not exceed from 5 to 7 pounds per day.

CORN.

Corn is the fattening feed, par excellence, in the Middle Northern States, where cattle-feeding is extensively carried on. No better feed is to be found anywhere, and with cotton-seed meal it makes a combination especially valuable; but the usual high price of corn precludes its extensive use in this State. It is seldom that corn is less than 50 cents per bushel, while generally it is above 60 cents per bushel, and at such prices it is doubtful if any of it can be economically used in the feeding of beef cattle as long as cotton seed do not go above 25 cents to 30 cents per bushel, and cotton-seed meal not above \$25 to \$30 per ton.

It is not certain that with good cattle and a long feeding period, corn at 50 cents per bushel may not be profitably fed, but in the experience of the writer, during the past winter it did not pay to feed corn in any quantity, although with one lot of cattle more rapid gains were made by a cotton-seed meal-corn and cob meal ration than by the cotton-seed meal-cotton seed rations. But when the cost of these more rapid gains was counted it was found that the lot making the cheapest beef was fed on cotton-seed meal and cotton seed with corn stover for roughage.

OTHER CONCENTRATED FEEDING-STUFFS.

The same facts and reasoning as above applied to the feeding of corn, probably also apply to all other high-priced grains or concentrates, such as wheat bran, rice products, gluten feeds, etc. In long feeding periods, small quantities of these feeds may possibly be used advantageously, but even this is doubtful, and it is quite certain that as a general rule the average feeder will not find their use profitable in any quantity.

RATIONS.

In presenting rations which from experience and observation seem to be best calculated to yield profitable results, it is not intended to convey the idea that these are the only combinations of our feeding-stuffs which may yield good results; but merely to indicate what are

probably most likely to yield the best results under the conditions found on the average farm.

The so-called "feeding standard" is merely believed to represent more or less closely the average needs of the beef steer for satisfactory gains, but it is not necessary that this "standard" be strictly adhered to; for the relative market prices of the available feeds must be given due consideration in practical feeding operations.

The generally accepted German "standard" divides the time which the fattening beef cattle are to be fed into three periods.

The following table shows the digestible nutrients thought to be required daily by a 1,000-pound steer for the different periods:

FEEDING STANDARD FOR FATTENING CATTLE.

	Dry Matter— Pounds.	Digestible Organic Substances.				Nutritive Ratio.
		Protein— Pounds.	Carbo- hydrates— Pounds.	Fats— Pounds.	Total— Pounds.	
First period	30	2.5	15.	.5	18.	1 to 6.5
Second period	30	3.	14.5	.7	18.2	1 to 5.4
Third period	26	2.7	15.	.7	18.4	1 to 6.2

Following the ideas expressed in our discussion of the feeding-stuffs thought to be available in North Carolina, we suggest the following rations for the different portions of the fattening period.

Taking a feeding period of 150 days for example, we would suggest a preliminary feeding period of 15 days for getting the animals up to the full ration contemplated in the regular first period of the "standard" given above. The remaining 135 days may then be divided into three equal periods of 45 days each as follows:

Preliminary feeding period.....	15 days.
First fattening period.....	45 days.
Second fattening period.....	45 days.
Third fattening period.....	45 days.

SAMPLE RATIONS.

At the beginning of the preliminary feeding period of 15 days, we may start the cattle on the following ration:

- 20 pounds corn stover.
- 10 pounds corn silage.
- 1 pound cotton-seed meal.
- 1 pound cotton seed.

The corn silage should be increased two pounds per day, until 30 pounds per day is reached, and $\frac{1}{4}$ pound each of cotton-seed meal

and cotton seed should also be added each succeeding day until 4 pounds of each is received daily by each animal.

The following rations for the three portions of the regular fattening period are suggested on the basis of animals weighing 1,000 pounds, and are for one day, but should be divided into two or three feeds:

	Dry Matter— Pounds.	Digestible Organic Substances.				Nutritive Ratio.
		Protein— Pounds.	Carbo- hydrates— Pounds.	Fats— Pounds.	Total— Pounds.	
First Period—						
20 pounds Corn Stover-----	15.44	.56	8.46	.14	9.16	
30 pounds Corn Silage -----	6.27	.27	3.39	.21	3.87	
4 pounds Cotton-seed Meal --	3.68	1.33	.89	.33	2.55	
4 pounds Cotton Seed-----	3.58	.50	1.20	.69	2.39	
Total -----	28.97	2.66	13.94	1.37	17.97	1 to 6.5
Standard -----	30.00	2.50	15.00	.50	18.00	1 to 6.5
Second Period—						
15 pounds Corn Stover-----	11.58	.42	6.35	.11	6.88	
40 pounds Corn Silage -----	8.36	.36	4.52	.28	5.16	
5 pounds Cotton-seed Meal --	4.61	1.67	1.11	.41	3.19	
5 pounds Cotton Seed-----	4.49	.62	1.50	.86	2.98	
Total -----	29.04	3.07	13.48	1.66	18.21	1 to 5.7
Standard -----	30.00	3.00	14.50	.70	18.20	1 to 5.4
Third Period—						
15 pounds Corn Stover-----	11.58	.42	6.35	.11	6.88	
25 pounds Corn Silage -----	5.22	.23	2.83	.18	3.24	
4 pounds Cotton-seed Meal --	3.68	1.33	.89	.33	2.55	
5 pounds Cotton Seed-----	4.49	.62	1.50	.86	2.98	
3 pounds Corn and Cob Meal	2.54	.13	1.80	.08	2.01	
Total -----	27.51	2.73	13.37	1.56	17.66	1 to 6.3
Standard -----	26.00	2.70	15.00	.70	18.40	1 to 6.2

In order to figure the cost of these rations it will be necessary to assign a value to the feeds used, as follows:

Corn stover	\$ 5.00 per ton.
Cotton-seed meal	25.00 per ton.
Cotton seed	15.00 per ton.
Corn silage	2.50 per ton.
Corn .....	.60 per bush.

At these prices for feeds the rations suggested will cost as follows:

Preliminary feeding period (average)...	13¼c. per day.
First fattening period.....	16¾c. per day.
Second fattening period.....	18¾c. per day.
Third fattening period.....	18 1-5c. per day.

If corn silage is not available, its place in the ration may be taken by one-half the weight of corn stover. In case neither corn stover nor silage has been provided, 25 to 35 pounds of cotton-seed hulls may be used as roughage.

In the absence of cotton seed add two-thirds of a pound of cotton-seed meal for every pound of the cotton seed suggested. If cotton-seed meal and hulls be the only feeds used, the feeding period should not extend over 100 days, and about 5 pounds of hulls should be fed for every pound of meal. A ration of this sort, say 7 pounds of cotton-seed meal and 35 pounds of hulls, would cost 17½c. per day, with cotton-seed meal at \$25.00 per ton and hulls at \$5.00 per ton.

PROFIT OR LOSS.

Thirty steers weighing 950 pounds each will cost, at 3½c. per pound	\$ 997.50
The cost of feeding with the rations suggested, for 150 days, will be.....	784.56
Total cost	<u>\$1,782.06</u>
If these cattle make an average gain of 1½ pounds per day and sell for 4¾c. per pound, they will bring.....	\$1,674.37
Loss	<u>\$ 107.69</u>
If they gain 1½ pounds per day and sell at 5 cents per pound they will bring.....	\$1,762.50
Loss	<u>\$ 19.56</u>
If they gain 1¾ pounds per day and sell at 4¾c. per pound they will bring.....	\$1,726.62
Loss	<u>\$ 55.44</u>
If they gain 1¾ pounds per day and sell for 5 cents per pound they will bring.....	\$1,817.50
Profit	<u>\$ 35.44</u>

If they gain 2 pounds per day and sell for $4\frac{3}{4}$ c. per pound they will bring.....	\$1,781.25
Loss .....	.81
If they gain 2 pounds per day and sell for 5 cents per pound they will bring.....	\$1,875.00
Profit	92.94

These figures make it plain that if a profit is to be made by feeding beef cattle for a period of 150 days an advance of from \$1.25 to \$1.50 per hundred pounds must be had in selling price over cost price laid down at the farm, and that an average daily gain of from $1\frac{3}{4}$ pounds to 2 pounds per day must be made by the cattle. Steers worth $31\frac{1}{2}$ cents per pound when bought, should gain two pounds per day on the rations suggested, and after being fed 150 days, and weighing 1,250 pounds each, should be well worth 5 cents per pound, farm weight.

On a shorter feeding period the gains ought to be a little better, but the selling price would probably be lower. In fact, the greatest difficulty is in finding a market accessible that will pay the full value for the better grade of cattle, and it is possible that a grade of cattle that can be sold for $41\frac{1}{2}$ cents and still leave a margin of $11\frac{1}{2}$ cents over purchase price will yield a larger net return, but with this grade of cattle the feeding period should be shortened or the gains will not be nearly so great as with cattle of better quality.

On the other hand, it should not be forgotten that there is certainly a profit on the corn stover at \$5.00 per ton, of at least \$2.00 per ton, and that there ought to be a profit of \$1.00 per ton on silage at \$2.50 per ton. The function of beef cattle is to turn feed into beef, and we therefore must not demand a profit on the production of the feed and on the cattle also.

If we count the corn stover at \$3.00 per ton and the silage at \$1.50 per ton—about what they should cost—there is a profit on feeding these 30 steers, even if they only make a gain of $11\frac{1}{2}$ pounds per day, and sell for $4\frac{3}{4}$ cents per pound. Moreover, if these cattle will pay the cost price of the feeds consumed, the manure, so much needed on our worn soils, will pay sufficient profit to justify the feeding operations.

GETTING TO FULL FEED.

This is a much more difficult and important matter than is commonly supposed. Not less than twenty to thirty days should be taken for the purpose, for the quantity of feed given at first should be very small and slowly and regularly increased in order to prevent derangement of the appetite or digestion. If care is not taken some of the cattle are more than likely to suffer from diarrhœa or "scours." This

trouble is undoubtedly the great bane of the feed-lot, and with the short fattening periods, common in the South, it is doubtful if an animal that suffers from a severe attack of it ever makes profitable returns for the feed consumed. Therefore, the importance of extreme care during the first few weeks of the fattening period cannot be too strongly emphasized.

Cattle right off the grass in October or November, that are confined to a dry lot, should have all the shredded stover they will eat, and about 15 pounds of silage. The silage should be increased about one pound per day until each animal is receiving from 35 to 40 pounds daily. In case cotton-seed hulls are the roughage used, they should be fed to the limit that the cattle will consume, during the early part of the feeding period.

With the grain feed more care must be taken. To start on, one pound of cotton-seed meal and one pound of cotton seed per day are sufficient; but the increase should begin at once, and amount to about one pound for each animal per week, until a full ration is received. A full ration is usually regarded as about all the animal will eat up clean, and such a ration usually produces the largest or most rapid gains, but the gains obtained from a heavy grain ration are frequently not made as economically as those obtained from a medium ration of concentrates.

FREQUENCY AND REGULARITY OF FEEDING.

There is no more potent factor in determining results in the feed-lot than regularity in all operations relating thereto. Few recognize its full force, and many are prone to disregard it entirely. By regularity is not only meant feeding at stated intervals, but also the feeding of the same quantity and quality of feed. An animal that is expected to make the best gain must be fed at the same time each day, and after he has once been put on full feed, he should also receive about the same amount each time. The practice of placing large quantities of feed before fattening animals, and keeping it before them all the time, is an expensive one, begot by carelessness, and, so far as I know, extensively practiced nowhere except in the South. A keen appetite is conducive to good digestion, and usually an indication of it; therefore, an animal should be given no more feed than he will readily eat up at the time, if a good appetite and satisfactory gains are to be maintained. Of course this requires more labor, but labor is cheap in such cases. All sudden changes in the kinds of feed are also to be avoided, for while a variety of feed is essential, this does not necessitate sudden changes, nor indeed changes of any sort.

The frequency of feeding is of less importance. The common practice is to feed twice a day, and this is probably the most economical method. Possibly greater gains would be made by feeding three

times a day, but considering the cost of labor, twice per day is probably as often as will be found profitable in most cases.

WATER.

The importance of an abundant supply of pure water cannot be overestimated. The supply of water should be ample, clean and not too far from shelter or feeding-place. In short, the steer should at all times have free and easy access to all the water he is inclined to drink.

SALT.

While salt is certainly of benefit to the fattening steer, it is a fact that its injudicious use may do serious harm. If fed at irregular intervals and the animals allowed to take too much, derangement of digestion and scouring may result.

Probably the best plan is to give the cattle a little salt in their feed each day, until their craving for it has been satisfied, and then put ordinary barrel salt before them, so that they may have liberty to eat what they want at all times. But unless care is taken to gradually satisfy the appetites of the steers for salt, before it is put before them in quantity, it is probably best to feed a little salt with each feed, or at least once a day with the feed. Judging from the quantity consumed by cattle that have free access to it, the amount of salt given in the feed need not exceed one dram per day.

FEED-LOTS AND SHELTERS.

The custom of feeding in the open, quite common in some parts of the South, has for its opposite the old method of stall-feeding. The former method has at least two advantages—cheapness, and that the manure may be deposited where needed without great waste or cost for handling. On the other hand, much feed is wasted and the exposure to wind and rain above and mud beneath frequently detract materially from the gains that would otherwise be made. The modern feeder, recognizing the disadvantages of both methods, the one with its exposure and waste of feed and the other with its too close confinement and increased expense of labor, profits thereby and feeds in rather large lots with cheap sheds for the protection of the cattle and feed boxes.

For the best results it seems certain that shelter must be furnished sufficient to afford full protection from wind and dampness, but it is doubtful if in this climate much attention need be given to providing warm stables. In the southern and eastern parts of the State an open shed, closed only on the north side and with a roof to shed the rain, is probably all that is necessary; but in the western and

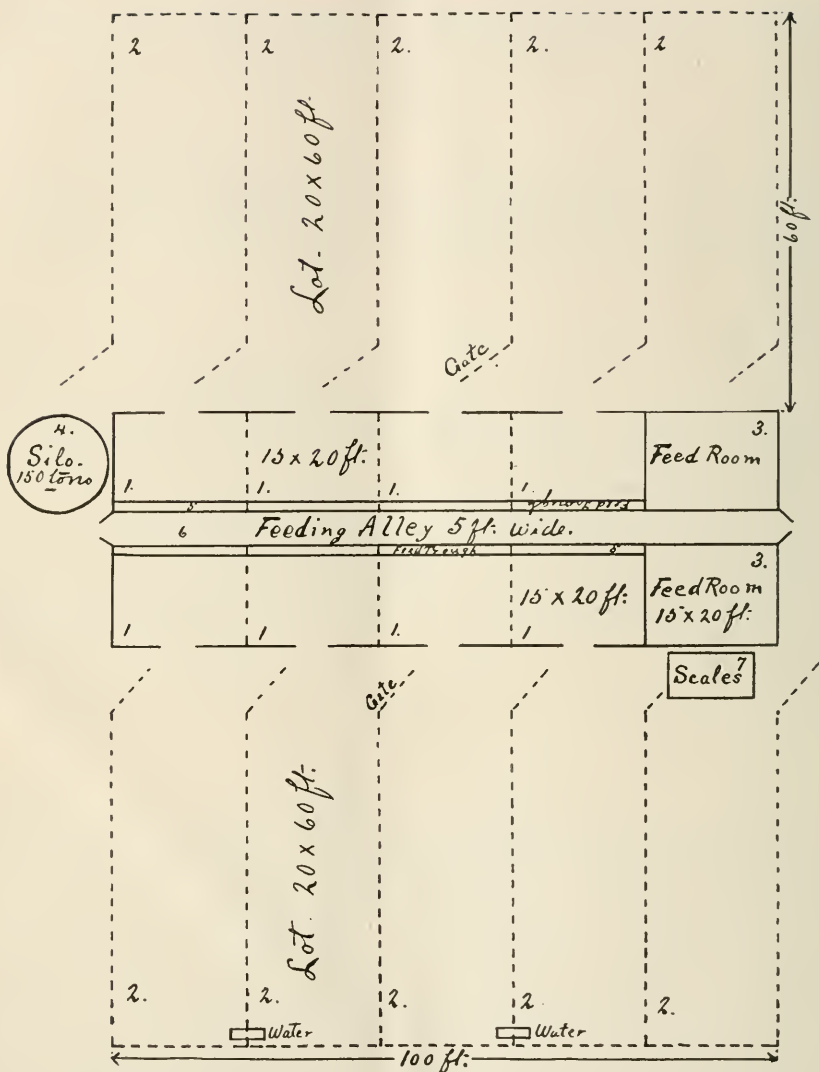


FIG. 4.—Ground Plan of Feeding-Barn and Lots at the Iredell Test Farm of the North Carolina Department of Agriculture.

northern sections of the State sheds or barns of moderately tight construction will be better. Figure 4, above, shows the plan of the barn and lots used at the Iredell Test Farm of the Department, during the past winter.

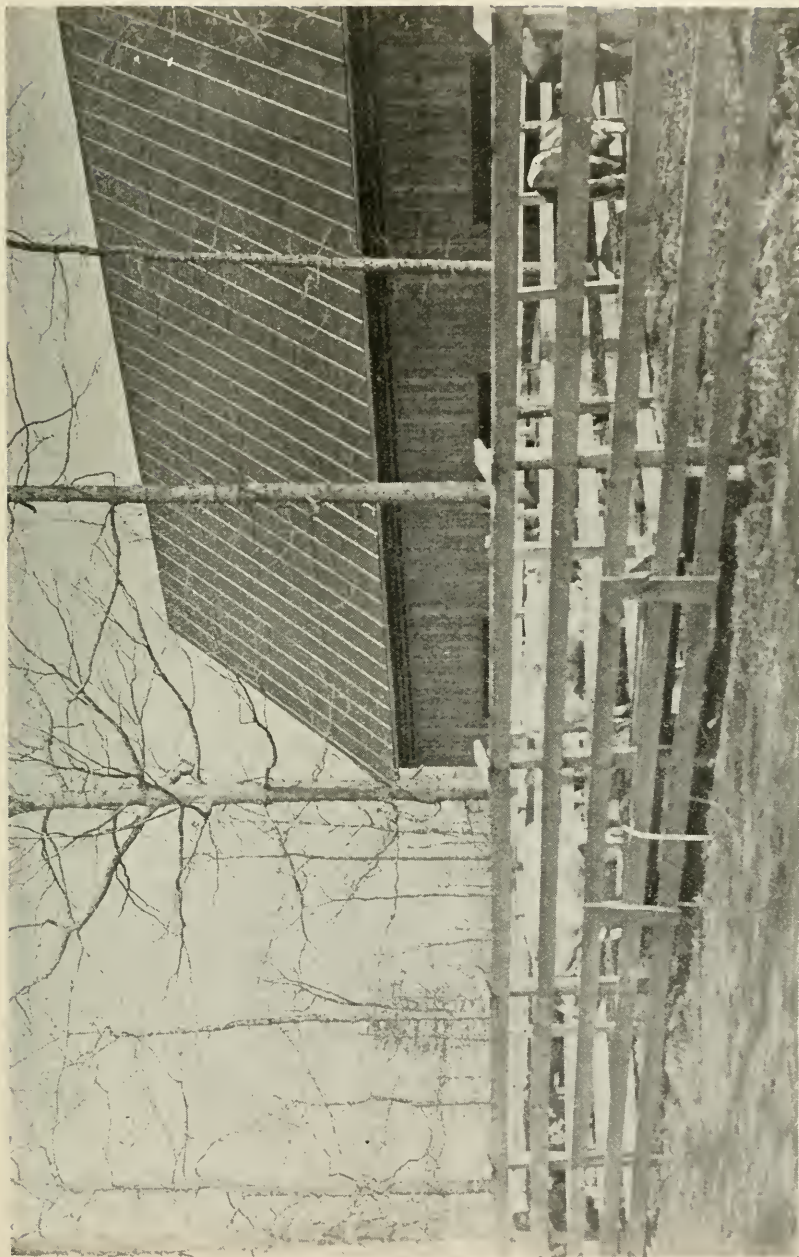


FIG. 5.—Cattle Barn and Lots at the Iredell Test Farm of North Carolina Department of Agriculture.

After using this barn for one year, experience seems to indicate that the large openings in the south side of the barn, as shown in Fig. 5, page 25, should be partially closed to give greater protection from the cold winds which occur during the winter in that section.

By reference to Fig. 4, it will be seen that each section of the barn is 15x20 feet, and has attached a lot 20x60 feet. The shelter afforded by each of these sections of the barn was ample for five steers weighing 1,000 pounds each, and six might possibly have been accommodated satisfactorily; but the lots, during wet weather, did not remain in a satisfactory condition. We are convinced that firm, dry lots are of importance in determining satisfactory results, and pains should be taken to select the best location for the feed-lots and everything practicable done to keep them in good condition.

MARKETS.

The absence of a convenient market from which a sufficient supply of satisfactory feeders can be obtained is further aggravated at the end of the feeding period by unsatisfactory markets for cattle of good quality. One reason that we have no nearby market for first-class beef cattle is because we have had no first-class cattle to sell. Complaint is commonly made that our markets will not give the full advance which good cattle command over the lower grades in the large markets like Chicago and Kansas City. In a measure, this is true. If the cattle are real good they will not bring the full advance which extra quality commands on the best markets; but fairly good cattle will bring a reasonable advance over the lower grades. In fact, even our local markets will pay an advance of from one to two cents per pound for good cattle over what is paid for the common sorts. As more good cattle are fed the butchers will also learn of their value and reasonable prices will be paid for quality. On the other hand, Philadelphia and Baltimore are not as far from North Carolina as Chicago and Kansas City are from large numbers of the cattle marketed there. Our freight rates are much higher, but these will come down as the number of cattle shipped increases, and probably not until then. When possible, we believe the feeder will find it more satisfactory to sell at the farm, instead of shipping, but this must be determined by each feeder after a full knowledge of all the conditions involved. If as many as a car-load are fed there will be no difficulty in getting a buyer from the markets of this and adjoining States to inspect the cattle and bid a price for them.

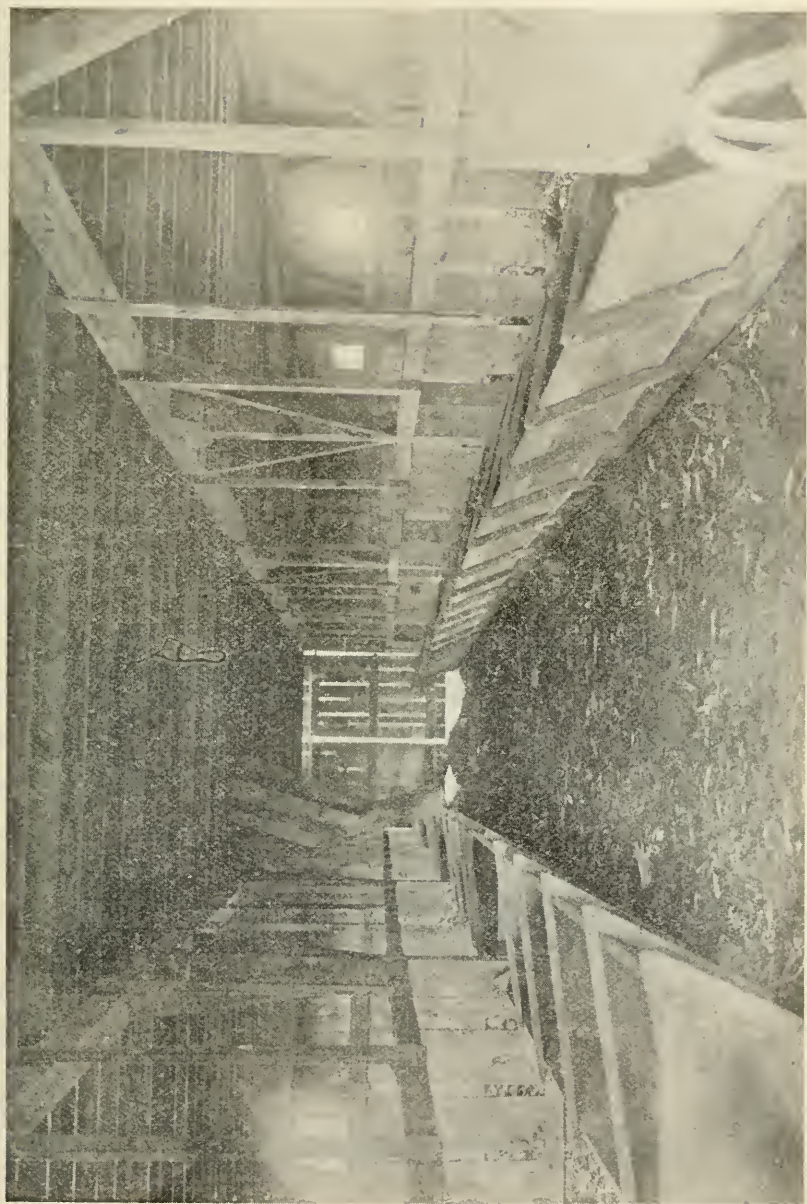


FIG. 6.—Interior of Cattle Barn at the Iredell Test Farm, North Carolina Department of Agriculture.

THE BULLETIN

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DEPARTMENT OF AGRICULTURE

ALFALFA GROWING

BY

C. B. WILLIAMS.



ALFALFA READY FOR THIRD CUTTING ON JULY 25,
EDGECOMBE TEST FARM.

JUNE, 1906

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 6.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, JUNE, 1906.

ALFALFA GROWING.

BY C. B. WILLIAMS.

For the past two or three years greatly increased interest has been manifested throughout the State in the growth of alfalfa, and, as a result, during this time thousands of inquiries from different localities concerning the value and adaptability of this plant to North Carolina conditions, as well as to the proper method of preparation of soil, time of planting, kind and amount of fertilizer to use, etc., have been received by the State Department of Agriculture. It is in response to this popular demand for information on alfalfa, with the realization of its great value for forage purposes, that this Bulletin has been prepared.

There is hardly any plant known the successful culture of which would give greater impetus to profitable live-stock growing, or that would stimulate a higher appreciation of the great importance and value of thorough preparation of the soil and rational fertilization upon successful farming, than alfalfa.

HISTORY.

Alfalfa, a native of southwestern Asia, five centuries prior to the Christian era, had been carried to and cultivated in southern Europe. The Romans used and appreciated it as a feed for their chariot and war horses before the birth of Christ. From Italy, in which country its growth has been maintained continuously to the present day, it found its way into Spain and France. The Spaniards during the Spanish Invasion carried it into South America and Mexico. During the middle of the nineteenth century it was introduced into this country through California by the Chilians. Since then it has gradually spread eastward, until to-day there is probably not a State or Territory in the Union in which this oldest of cultivated forage plants is not grown to some extent. Where this plant has come

to us from Spain, directly or indirectly, it is known as alfalfa; while if brought from other countries of Europe (and it is in isolated instances here and there), it is generally called Lucerne, from a valley in Switzerland by the same name, in which it grows well and in large quantities.

HABIT OF GROWTH.

Alfalfa or Lucerne (*medicago sativa*) is a perennial belonging to the clover family of plants. It grows generally with slender branching stems which are stiffer, taller and more woody in character than those of any of the clovers; especially is this so after the plants have reached the blooming stage. The leaves are pinnate in form with three-toothed leaflets each about an inch in length and ovate-oblong in shape, and much resembling those of sweet clover. The flowers are purple in color and grow in clusters, known by botanists as racemes.

The seed, borne seven to nine in pods coiled spirally as shown in Fig. 1, are a trifle larger, longer and more kidney-shaped than those of red clover, but in other respects are very similar.

The root system is large and deeply penetrating. As a rule, one main tap-root is sent deep into the ground, and as this penetrates the soil it throws out a few lateral roots and frequently divides a number of times; but the general tendency of the whole root system is downwards, as shown in Fig. 4, going frequently to the depth of twenty or thirty feet, and instances are on record where they have been traced to a depth of fifty or sixty feet. Its roots will not go far, however, into soils possessing barren clay subsoils or into soils that are saturated with water or that are subject to overflow frequently. In fact, there is nothing that will kill out alfalfa quicker than an excessive amount of moisture. As the plant advances in age and the crown increases in size, new roots are sent into the soil from the surface in search of moisture and plant-food.

The great superiority of this legume over others of the same family is the great depth to which it feeds when once established, as well as its long life and the small expense required to keep it up after once a stand has been secured and maintained for one year.

On page 8 (Fig. 2) is reproduced a portion of the stem of an alfalfa plant showing leaves and flowers and their arrangement on the stem.

INOCULATION.

All leguminous plants, such as alfalfa, cowpeas, clovers, vetches, beans, etc., are endowed, under certain conditions, with the power of obtaining the nitrogen required for their growth largely from the illimitable supply of the atmosphere; while corn, cotton, wheat, and other plants not belonging to the above group are entirely devoid of this power, and are dependent upon the store of this constituent



FIG. 1—PORTION OF STEM OF ALFALFA PLANT SHOWING ARRANGEMENT AND SHAPE OF SEED-PODS.

present in the soil, naturally or added, to supply their needs in this direction.

With season and soil favorable to plant growth, the conditions required to enable alfalfa, as well as other legumes, to be able to use free atmospheric nitrogen is the presence, on the roots, of knots, nodules or tubercles (see Fig. 4), and within these the presence and activities of millions of bacteria or micro-organisms which are able to take and combine the free nitrogen of the air into combinations that can be taken up by the host plant and elaborated into building material for its different tissues. It should be remembered, however, that all legumes, especially when growing on rich soils, will frequently make luxuriant growth without the presence of such nodules on the roots and the activities they represent; but will be unable to secure and use nitrogen, except that present in the soil in an available form. When grown under these conditions, leguminous plants will add nothing to the soil except what they have taken directly from it. Alfalfa and other legumes have each a specific species of nitrogen-gathering bacteria that should be present in or be added to a soil on which it is proposed to grow the different ones; for when these specific germs or bacteria are present in sufficient numbers the plants will make their best growth and do their most effective work in gathering nitrogen for the benefit of the farmer and for the improvement of his land. It should be remembered that, although inoculation is generally necessary for successful alfalfa growing in North Carolina, it cannot in any way make up for any deficiencies in drainage, fertilization, preparation of the soil or subsequent management of the crop. The successful carrying of these bacteria, germs, or micro-organisms into any soil, either naturally or artificially, is known as inoculation.

Any one of the four methods outlined below may be used in the inoculation of soils for alfalfa culture:

By Use of an Infected Soil.—In this method usually from 100 to 500 pounds of surface soil, from a field on which alfalfa has been grown successfully with the formation of a large number of nodules on the roots, is taken and scattered uniformly over and harrowed into the field on which it is proposed to grow alfalfa, putting the soil on preferably at the time or just before the seed are sown. It has also been demonstrated that soil taken from a field on which either bur clover (see Fig. 3) or sweet clover has grown with the formation of a large number of nodules on their roots, will prove as effective inoculating agent for alfalfa in new surroundings as soil from an alfalfa field; in other words, it seems to be pretty definitely settled that the bacteria that inoculate alfalfa, bur and sweet clovers are identical or practically so. The dangers attending the use of soil taken from one field to another for inoculating purposes are that the seeds of noxious weeds and grasses as well as the germs of bacterial diseases like root-knot, wilt, etc., may be carried with the inoculating soil to a

new and uninfected field to largely unfit it, not only for the purpose for which it is being put in order, but also for the growth of a large number of other crops. These facts emphasize the necessity for great caution in transporting and using soil for inoculating purposes from unknown parties and fields.

When soil is used, it will be well, if possible, to collect it during cloudy weather and apply it broadcast over the prepared field on a cloudy day, and preferably immediately preceding a rain, so that the bacteria contained in it will be washed into the soil which it is desired to inoculate. If for any reason there intervenes any great length of time between the taking of the soil from the infected field to the applying of it on the field that is to be sown to alfalfa, the soil should be stored in some cool, dark room to prevent its drying out, for too much drying and direct sunshine on the inoculating soil will prove fatal to the beneficial bacteria which it contains. Notwithstanding the drawbacks attending the use of this method of inoculation, it has been found during the past four or five years in work along this line being conducted on the Test Farms of the State Department of Agriculture with alfalfa, bur clover, and hairy vetch, that this is one of the most successful and practical methods thus far tried. It is rather an expensive method, however, especially if the inoculating soil has to be brought from any great distance; but taking everything into consideration, the expenses incurred by this method will be justified generally by the success resulting from its use.

By Water-extract from an Infected Soil.—With this method, generally from 50 to 100 pounds or more of soil, from some field on which either alfalfa, bur clover or sweet clover has grown well with the formation of a large number of nodules on the roots, are placed in some vessel and enough water added to more than cover it. The whole is then thoroughly stirred with a stick or paddle in order to bring the water into intimate contact with all portions of the soil, after which the mixture should be allowed to stand and settle for a short while.

The seed to be sown should be soaked in the water that stands above the soil only a sufficient length of time to be assured of their becoming thoroughly wet. This may be done by placing the seed in a coarse bag and dipping them in the water for a few minutes, or by pouring off sufficient of the water from the soil into a separate vessel into which the seed had previously been placed and allowing to stand, after the seed have been stirred, only for a short time. In either case, the seed should be removed from the water and spread out in a thin layer in some cool, shady place where the air is stirring and be allowed to dry out. It will be well for the seed to be exposed as little as possible to direct sunlight after this treatment, and to go into the ground pretty soon after the inoculation.

This method of inoculation is generally resorted to when the quantity of inoculating soil is relatively scarce for any reason: and,



FIG. 2—STEM, LEAVES AND FLOWER CLUSTERS OF ALFALFA.

if the precautions given above are observed, satisfactory results should be obtained by its use with alfalfa.

By Artificial Cultures.—The artificial cultures that have been placed upon the market during the past few years have generally been found to yield unreliable results, even when used according to directions, and in most cases have proven absolutely worthless. Especially has this been found to be the case with those that were sent out in dried cotton; because of defects in the method which largely defeated its purposes. At present, so far as the writer is aware, there are no cultures prepared by this method on sale in the markets that could be recommended as thoroughly reliable. The National Department of Agriculture has, however, distributed during the past year in sealed bottles pure active cultures in liquid medium that were poor in nitrogen, and which yielded very satisfactory results where used.

By Natural Inoculation.—On soils already abundantly supplied with the specific bacteria desired, or on soils possessing great fertility, inoculation will generally prove of little or no benefit; because, in the first instance, inoculation is already complete; while in the second case it is unnecessary, as the plants can get from the large available supply of the soil all the nitrogen needed for their growth, and probably do it much easier in this way, especially where the supply is abundant, than through the intervention of bacteria. In fact, with very favorable surroundings the bacteria themselves largely lose their power of forming nodules on the roots of the host plants; hence, it is often observed that legumes growing on very rich soil frequently have few nodules to develop on their roots. In other words, the bacteria, like some people, grow indolent when surrounded by plenty and hence relieved of the necessity for work. When alfalfa, or any other leguminous crop, is grown upon a piece of ordinary land in good physical condition it will gradually become inoculated with the specific nitrogen-gathering bacteria essential for the best growth of that particular crop. It may be found that in the first year only a few plants have naturally become inoculated, while in the second year a larger number would be found, and in the course of a few years, if the same legume were continuously planted on the same piece of land, it would become thoroughly inoculated. The chief objection, however, to this method of inoculation is the great expense and trouble incurred by several crop failures before inoculation is complete enough to be reasonably assured of success in growing the legume desired, when other conditions are favorable.

SOILS.

Favorable Soils.—Although alfalfa is adapted to a wide range of soils, it seems to do best generally upon a fine sandy loam soil well supplied with plant food, especially lime, and possessing a rather open, porous and well-drained subsoil, so that the roots can penetrate

to great depths. However, in this and many other States it is grown with great success upon some of the most compact red-clay soils and those that are underlaid by heavy clay subsoils. In fact, it seems that with proper care alfalfa may be produced on almost any sweet soil that is not too open from sea-level to an altitude of 6,000 or 7,000 feet, and that is well drained and in a good state of fertility, either naturally or by application. This crop is especially fond of a calcareous soil.

Unfavorable Soils.—Alfalfa does not grow well on a thin soil nor on any kind of soil that is underlaid by a hard-pan, crawfish, barren clay, or rock subsoil, for into these the roots cannot penetrate to very great distances. As free-water in the soil is deadly to its growth, a soil that is not well drained, either naturally or artificially, will be found unsuited to the growth of this legume. Also soils that are subject to overflow had best be put in some other crop to be reasonably assured of a successful outcome.

Alfalfa, as well as most all the other leguminous plants, being very sensitive to acidity, will not do well upon soils that are very sour or acid; hence it has been found, generally for the soils of North Carolina, which are frequently sour and usually very low in content of lime, that a liberal application of lime is almost always a necessary requirement for success.

Preparation of the Soil.—There is hardly any plant with which a well-prepared seed-bed is a greater determining factor than with alfalfa; for the young plants are about the weakest of all farm crops, and if the soil is not in first-class condition a failure in stand is generally the result, matters not if all other conditions required for success are favorable. Land intended for alfalfa should be selected at least a year previous to the putting out of the crop, so that its treatment may be such as to prevent weeds and grasses from going to seed, as well as to induce all those seeds in the soil to sprout so that they may be killed; for there are not two more overpowering and deadly enemies of the alfalfa plant during the first year than grass and weeds. It will also be well, certainly for all soils in only a fair state of fertility, to make an application of a very heavy coating of stable manure (free from grass and weed seeds) to the crop preceding the alfalfa. It has been found that cowpeas, corn, potatoes, tobacco, cotton and other clean-cultured crops are well suited to precede this crop. The ideal seed-bed is the one that is in a fine mellow condition to the depth of about three inches, but below this is in a more or less firm condition, without being hard, compact and impenetrable to the roots of the young plants. This state of the soil may be obtained by breaking the land well with a good two-horse plow, allowing it to stand some little time and be exposed to one or two good rains, running the disk-harrow over it once or twice to kill the grass and weeds that may have sprouted; and then just before planting time break it thoroughly again with some good cultivator or disk-harrow, preferably



FIG. 3—ON LEFT, INOCULATION OF ALFALFA ROOT BY BUR (2) OF BUR CLOVER, WITH A NODULE AT 1; ON RIGHT, BUR CLOVER ROOTS WITH NODULES.

the latter, going both ways and to the depth of two to three inches. This treatment, followed by a thorough harrowing and cross-harrowing with some good smoothing or spike-tooth harrow, should put ordinary soils in a first-class condition for the reception of the seed. No clods should be present.

It has frequently been found that by following cowpeas or corn with alfalfa a good seed-bed may be secured, after taking off the corn or cowpea crops, by simply disking the land thoroughly and harrowing it smooth and fine. However, with most soils in this State, especially those which have a tendency to run together and compact after rains, it will be best, as a general rule, to break them seven to ten inches deep with a good two-horse plow some little time prior to the seeding, for the reasons given above.

SEED.

Good, bright, plump seed free from impurities are essential to success, for it matters not in how good heart the soil may be or how well it is fertilized and inoculated, failure will generally be unavoidable when poor seed are sown. There are on sale in our markets alfalfa seed that are of a poor quality and besides are highly adulterated with the seeds of cheap clovers, dodder (love-vine) and many species of obnoxious weeds. New seed are of a light greenish or brownish yellow color, while old ones, or those that have been damaged in any way, are of a darker and duller luster. When the seed are shrunken or damaged in any way it will be well to determine their vitality by running a few germination tests before risking the seed in the ground. As alfalfa seed are expensive, and hence the temptation for their adulteration strong, great care should be exercised in purchasing them.

FERTILIZATION.

Before Seeding.—Soils intended for alfalfa growing should be well supplied with available plant-food, especially lime, potash, and phosphoric acid. Nitrogen, in available form and in liberal quantities, should also be present in or supplied to the soil, or else the young plants will not grow off well: for in their early stages of growth, notwithstanding the fact of the soil being thoroughly inoculated and that they belong to a class of plants capable of assimilating nitrogen from the air through the agency of bacteria in nodules on their roots, the young plants are largely dependent for the nitrogen required for growth upon the supply of this constituent stored in the seed and that present in the soil in an assimilable form. A liberal application of stable manure to a previous crop or the plowing under of a good and thoroughly matured growth of some leguminous crops a year before will usually supply the necessary nitrogen to the young alfalfa plants in a form and condition suitable for immediate assimilation.

lation. Not only will these supply nitrogen, but will also store the particular soil well with humus; a moderate quantity of which is highly essential for the soil to produce its best results with alfalfa. If the soil is not rich—and it will be difficult to get it too rich—even though this previous treatment has been accorded, it will be well usually to make a second liberal broadcast application of well-rotted stable manure to the land, after the breaking and just before disking, and work it thoroughly into the soil with the subsequent part of the preparation. After the disking, usually about 1,000 pounds of high-grade slaked lime per acre should be broadcast over the field uniformly and worked into the soil by means of the harrow. When this is accomplished on the average soil of the State from 400 to 500 pounds per acre of a mixture of two parts of acid phosphate and one part of kainit should be scattered over the field evenly and thoroughly worked into the surface soil. If the land is not for any cause well supplied with available nitrogen, it will generally be found expedient to add something like 50 to 75 pounds of nitrate of soda or sulphate of ammonia to the mixture of acid phosphate and kainit.

This treatment with the preparation suggested in another paragraph should leave the land in good shape for the reception of the seed.

After Seeding.—During late fall or early spring, after the first year or so, it will usually be found advisable to apply broadcast over the alfalfa field during the winter or early spring, at the rate of 300 to 400 pounds per acre, the mixture of acid phosphate and kainit given above, and repeat the application at such intervals as the growth and appearance of the plants may indicate as necessary. It has frequently been observed by alfalfa growers that, after the first few years' growth on most soils not of a calcareous character, and notwithstanding the fact that liberal applications of fertilizers have been kept up, the plants begin to fail perceptibly. The cause for this is often due to a sour or acid condition into which the soil has gotten. It will be the part of prudence to make an application on most North Carolina soils of about 1,000 pounds of slaked lime per acre every four to six years; the frequency of the application being largely governed by the nature of the soil and the requirements of the plants. On most lands in only a fair state of fertility, a broadcast application of stable manure at the rate of 3 to 5 tons per acre after two or three years will generally prove highly beneficial to the alfalfa.

SEEDING.

Time.—In North Carolina alfalfa may best be sown usually from the middle of March to the middle of April, after heavy frosts have passed, or from the twentieth of August to the first of October. There are special advantages and disadvantages, however, attending both spring and fall sowing. In the spring, the seed-bed can usually be



FIG. 4—PORTION OF ROOT-SYSTEM OF ONE-YEAR-OLD ALFALFA PLANT, SHOWING A TYPICAL BUNCH OF NODULES ON THE RIGHT LATERAL ROOT.

gotten in and maintained in better shape than in the early fall, as the moisture conditions are generally more favorable; but on the other hand, as plants from spring-sown seed are more liable to be choked out by crabgrass and weeds, alfalfa sown in the fall gets well established in the soil during the fall and winter, and when the weather commences to warm up in early spring the young plants begin vigorous growth long before the grass and weeds do, and thereby get a substantial and generally victorious start on them. It should be remembered that as alfalfa has such exceedingly weak and delicate plants that are easily smothered out when very young, it will not require very adverse weather and soil conditions or very strong and persistent competition from grass and weeds to stifle it out during the first few weeks of its growth. In the eastern portion of the State, where the natural grasses, especially crabgrass, grow so luxuriantly and abundantly, the weight of evidence at hand seems generally to favor fall seeding, especially where previous efforts have not been exerted to kill the grass and weed seeds in the soil; while for the Piedmont and western portions it does not appear so highly essential that the seed be sown in the fall in order that the plants may have a good start on the grass in the spring, as natural grasses do not seem to grow here so abundantly in the cultivated fields.

With fall seeding, it should be done early enough so that the plants will have developed several leaves before frost comes. Young alfalfa will stand a reasonably heavy frost without being destroyed, if the plants have as many as two or three leaves, but the further it is advanced the better it will be for it.

Quantity of Seed.—The quantity of seed required to give a good stand of alfalfa under favorable soil and weather conditions will depend largely upon the adulteration and vitality of the seed used. All the way from 10 to 40 pounds of seed per acre have been recommended; but for North Carolina soils in good heart it will generally be found that from 20 to 25 pounds of good pure seed will give an excellent seeding.

Manner of Seeding.—Seed may be put in drills or be broadcast. The most common method, however, and the one that has generally yielded the most satisfactory results, is to broadcast the seed on a well-prepared seed-bed, going across the field both ways, in order to secure a uniform distribution of the seed. After the seed are sown, and before covered, the inoculating soil may be put on broadcast and both be covered at the same time by means of a weeder or harrow going lengthwise and then crosswise the field. The seed should generally be covered from one-half to two inches deep. In a soil of a wet or compact nature less than one inch of covering will usually prove sufficient, while on soils more or less open the seed may be placed in the soil two or three inches, frequently with benefit. In other words, the more open the soil, the deeper, other things being equal, the seed may be put with safety. Should the land on which

the alfalfa is sown be of such a character as to run together and harden when dry, it will frequently be found advisable to run over the field with a light harrow to break the crust formed should a rain fall before the seed have sprouted very much; because if this is not done a large percentage of the young and tender plants will perish in their futile efforts to reach the air and sunshine.

TREATMENT FIRST YEAR.

With alfalfa, the first year is the most critical period of its life, for if proper treatment is not given it, failure will almost invariably result, notwithstanding the fact that the young plants may have started growth with every prospect of success. During the first spring and summer it should be mowed off 2 to 3 inches above the ground, whenever the plants have attained a height of 7 to 10 inches or begin to bloom, and more frequently if the alfalfa shows signs of failing, resulting usually from being overshadowed and robbed of moisture and plant-food by grass and weeds, or from attacks of fungous disease of the leaves, which is indicated by their turning yellow and falling. These frequent clippings will not only tend largely to keep the grass and weeds in subjection, but will also stimulate a stronger and more vigorous growth of the young plants, as well as inducing a branching of old and multiplying of new stems of the same plant. The clippings may be done with a mowing machine, elevating the cutter-bar slightly, if necessary, so that the cutting will not be too close to the ground. During the first year, if the cuttings are only small, they should usually be left on the ground to protect and improve the soil. The number of cuttings per year will be governed largely by the fertility of the soil and the kind of seasons. Alfalfa, whether spring or fall-sown, during the first and succeeding years, should not, under North Carolina conditions, be clipped after the fifteenth of September; because the growth made during the fall months should go to form a protection of the crowns and roots of the plants against the cold of winter.

Treatment in Succeeding Years.—During the spring and summer of the second and succeeding years alfalfa should be cut when about one-tenth to one-fifth of the flowers have bloomed—which is usually about a month before red clover is ready—or at any other stage of growth before this if the plants are not growing thriftily. If cut at this stage, it will not only be better for the plants, but a less woody and more palatable and highly digestible hay is secured. When the cutting is delayed, the leaves of the plants, which ordinarily constitute from 40 to 50 per cent of the plant, and contain from two to four times as much protein, pound for pound, as the stems, turn yellow and fall off; hence especial efforts should be directed in saving in good condition, both by proper cutting and curing, all the leaves produced by the plants. Where alfalfa is being grown for hay,



FIG. 5—SHOWING THE CHARACTERISTIC DYING BACK OF THE STEM OF ALFALFA TO LATERAL BUDS AS A RESULT OF CUTTING OR GRAZING.

and this should be the principal object when grown in North Carolina, it should also by no means be allowed to advance to the seeding stage before cutting; because, as pointed out above, not only hay of inferior quality is obtained, but the vigor of the plants is greatly reduced, and subsequent cuttings greatly diminished for the year. After alfalfa has become well established, it will frequently be benefited by an occasional cultivation with a disk-harrow. It may be disked in the spring before the plants begin vigorous growth, or it may be disked after each or any cutting if necessary, but under ordinary conditions the early spring disking will prove sufficient and the best time. The disks should be set rather straight, so that they will split the crowns of the plants without tearing or cutting off any of the stems, and should be forced to the depth of about two or three inches. If much grass and weeds are present it will be well to follow the disk with a spike-tooth harrow and rake out most of the tufts of grass and weeds. The disking will, by loosening the surface soil and uprooting of grass and weeds, not only afford better mechanical condition of the soil, but will promote a more healthy and vigorous growth of the crop. Often by such a disking the stand is greatly thickened; this resulting from the splitting of the crowns of many of the plants into two parts, which develop each into new and vigorous plants. In this climate, from three to five cuttings per year should be afforded with a yield of from 1,000 to 2,000 pounds of hay per acre for each cutting. Of course, with this as with other crops, yield will be governed by a number of conditions—controllable and uncontrollable.

ALFALFA FOR HAY.

Alfalfa not only produces a large quantity of hay, but a hay that is highly relished by all kinds of stock, and one that is of a superior feeding value. To secure the best hay, the plants should be cut just as they are coming well into bloom; for hay cut at this stage of growth of the plants will contain the highest percentage of leaves and the maximum amount of digestible nutrients. In curing, the hay should be handled in such a manner as to prevent as far as possible the loss of the leaves, for they are the most valuable part of the alfalfa plant for feeding purposes. A good method to follow will be to rake the hay into medium-sized windrows after it has wilted and dried out a little. If the weather is favorable, it might remain in the windrows and be cured there; but as a general rule it will be best for it to remain in the windrows long enough only to partially dry out, but not a sufficient length of time to get so dry that the leaves will shatter off when it is handled, and then be thrown into tall, narrow cocks. If this operation is followed by hot, dry, windy weather, the hay will cure out sufficiently in a few days so that it may be hauled and put into the barn or stack with safety. Generally, however, it will be the part of wisdom to open up the cocks in

two or three days, scattering the hay and turning it once to facilitate and hasten drying; re-cock, and then haul to the barn. It should be remembered that in haying, other things being equal, the best hay is the one the smallest percentage of which has been exposed to direct sunlight in curing thoroughly. All hauling should be done when the alfalfa hay is slightly damp with dew in order to reduce the loss of leaves to as small a percentage as possible. Alfalfa is probably a little more difficult to cure than red and crimson-clover hay; its hay is also more injuriously affected by a rain than that of either of these. It can be determined when the hay is in a condition suitable for the mow by taking a wisp between the hands and giving it a hard, strong twist. If no sap appears in the twisted portion of the stems, it is in a proper condition to keep, notwithstanding the stems may be tough; but if sap does appear, it had better stay in the cocks a few days longer before being hauled. The value of alfalfa hay is about equal to that of good wheat bran. It has a high digestibility if cut at the right stage and cured properly.

ALFALFA FOR PASTURAGE.

Alfalfa is distinctly a hay crop. It is not generally very well adapted to pasturage, although it may be, and is, used for this purpose. Unlike grasses, when it is nipped off, growth largely ceases until lateral buds or new stems from the crown can be developed. The result of cutting off the stem of an alfalfa plant is very well shown in Fig. 5, where by the dying back after cutting of the old stem the live lateral buds lower down on the stem have been stimulated into increased growth. During the first year, alfalfa should not be pastured; but may be lightly during the second and succeeding years. At no time should the pasturing be close, as it will greatly injure the crowns of the plants. There is more danger attending the pasturing of horses and sheep on this crop than of cattle and hogs. If horses, sheep and cattle are at first pastured continuously they will be likely to eat too much, which will result frequently in indigestion and consequent bloating. They should be turned into the pasture when not hungry and allowed to remain for only a short while each day, until they have become accustomed to it. Hogs can be pastured with safety, but they should be ringed before being turned into the alfalfa and should not be allowed to graze too long on the same field. Sheep are especially hard grazers on alfalfa, because they eat off very close and clean the young buds that develop in the axes of the branches. If pastured too much with this animal great injury and death to the alfalfa is likely to result. Pasturing should never be permitted either when the ground is frozen or when it is wet and muddy, because, if it is allowed, the crowns of the plants will be injured and finally destroyed. In fact, it will be best to keep

all stock off of the alfalfa field during the winter, as there is increased danger to the animals themselves when grazing it after frost.

ALFALFA AS A SOIL PROTECTOR AND ENRICHER.

It is true that alfalfa, being such a luxuriant grower and large hay producer, draws heavily upon the plant-food resources of the soil; but, notwithstanding this fact, it is a great soil enricher, if phosphoric acid and potash in available forms are present in or are added to the soil in sufficient quantities to promote its most favorable growth. The enriching of the soil is largely through the following means:

(1) If the alfalfa is inoculated thoroughly—which is generally evidenced by a healthy luxuriant growth—many pounds of costly nitrogen per acre are each year taken from the atmosphere for the growth of the plants. This nitrogen, contained in the plant structures, will, when the hay is fed, be excreted partly in the urine and droppings of the animals, which may go to enrich the alfalfa or some other field with nitrogen and humus—two constituents that are greatly needed in most of our North Carolina soils for the growth of larger crops.

(2) The roots of the plants, penetrating to great distances in the soil, draw largely for their mineral plant-food constituents from depths that ordinary agricultural plants are not able to reach. It, as it were, gradually and to a slight extent at least, brings some of the latent plant-food resources underneath the soils to the surface for future use. The deeply penetrating habit of its roots also gives alfalfa great resisting power to droughts.

(3) By the roots penetrating the soil in every direction and finally dying in it, the mechanical condition of the soil and subsoil is greatly improved and a large amount of their inert mineral fertilizing constituents are thereby brought into such a condition as to be capable of and suitable for the nutrition of plants growing on the ground subsequently. A crop of alfalfa is also a great protection against washing of the soil on which it is growing, due to the increased holding power of the soil for moisture, and also to the constantly interfering and retarding influence of the mass of alfalfa crowns and fallen leaves for any surface-water that may have accumulated during an excessive rain. It must not, however, be inferred from the facts given above that alfalfa can be used to improve a poor worn-out soil, for such will not be found to be the case, as it will generally fail to make satisfactory growth on all poor and impoverished soils.

When once a good stand of alfalfa has been secured on a field in a fairly good state of fertility, it will frequently grow well for 10 to 15 years, or even longer, if proper management and fertilization are given it.

- I. ANALYSES OF FERTILIZERS—FALL AND SPRING SEASONS, 1905-'06.
II. ANALYSES OF COTTON-SEED MEALS.
III. REGISTRATION OF FERTILIZERS.

THE BULLETIN

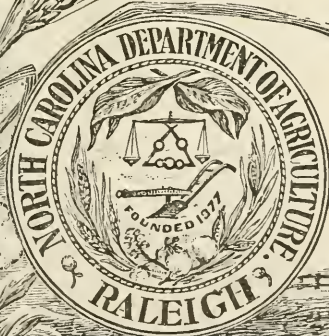
OF THE

NORTH CAROLINA

STATE BOARD OF

AGRICULTURE

Raleigh



JULY, 1906.

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION.

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 7.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, JULY, 1906.

I.—FERTILIZER ANALYSES.

FALL SEASON, 1905—SPRING SEASON, 1906.

BY B. W. KILGORE, STATE CHEMIST.

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The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the fall months of 1905 and the spring months of 1906, and therefore represent the character of fertilizers the farmers have used on the crops of the past year. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know whether or not they contained the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in a condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other sub-

stances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by the plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the head of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration: but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

FORM OF POTASH IN TOBACCO FERTILIZERS.

Tobacco growers are becoming yearly more disposed to know the form of potash, whether from kainit, muriate or sulphate, which enters into their tobacco fertilizers. Considerable work of this kind has been done for individuals, and we now determine the form of potash in all tobacco brands, for the benefit of tobacco growers.

The term potash from muriate, as reported in the analyses, does not mean, necessarily, that the potash was supplied by muriate of potash. Sulphate or some other potash salt may have been used, but in all fertilizers where the term potash from muriate is used, there is enough chlorine present to combine with all the potash, though it may have come from salt in tankage, kainit, or carnallite. As the objection to the use of muriate of potash in tobacco fertilizers arises from the chlorine present, it does not matter whether this substance is present in common salt or potash-furnishing materials.

The use of sulphate of potash where there is chlorine present in the other ingredients of the fertilizer will not prevent the injurious effect of the chlorine. The term potash from muriate in our analyses, therefore, means that there is sufficient chlorine present in the fertilizer from all sources to combine with the potash to the extent indicated by the analyses.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the cost of fertilizing materials is liable to change as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1905.

In Unmixed or Raw Materials.

For ammonia	141½	cents per pound.
For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in fine bone meal.....	31½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For ammonia	161½	cents per pound.
For phosphoric acid.....	41½	cents per pound.
For potash	51½	cents per pound.

The valuations decided on for this season, for the reasons already given, are:

VALUATIONS FOR 1906.

In Unmixed or Raw Materials.

Phosphoric acid in acid phosphate.....	4	cents per pound.
Phosphoric acid in bone meal.....	31½	cents per pound.
Ammonia	141½	cents per pound.
Potash	5	cents per pound.

In Mixed Fertilizers.

Phosphoric acid	41½	cents per pound.
Ammonia	161½	cents per pound.
Potash	51½	cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—2 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and ammonia 2 per cent, the calculation is made as follows:

Percentage or Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton 2,000 Lbs.
8 pounds available phosphoric acid at 4½ cents -----	$0.36 \times 20 =$	\$7.20
2 pounds potash at 5½ cents -----	$0.11 \times 20 =$	2.20
2 pounds ammonia at 16½ cents -----	$0.33 \times 20 =$	6.60
Total value -----	$0.80 \times 20 =$	16.00

Freight and merchants' commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Nor- folk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance	\$3.20	\$3.20	\$3.40	\$3.20
Apex	2.70		3.80	3.00
Ashboro	3.20	3.20	3.60	3.20
Asheville	4.00	4.00	4.00	4.00
Chapel Hill	2.95	3.20	3.90	3.20
Charlotte	2.65	3.30	3.20	3.20
Clayton	2.48	2.86	3.63	2.83
Cherryville	3.85	3.60	3.40	3.60
Clinton	1.60	3.00	3.20	3.00
Creedmoor	3.00	3.00	3.80	3.00
Cunningham	3.00	2.40	4.00	2.40
Dallas	3.00	3.60	3.40	3.60
Davidson College	3.00	3.20	3.20	3.20
Dudley	1.70	3.00	3.20	3.00
Dunn	2.00	2.80	3.20	2.80
Durham	2.80	2.83	3.60	2.83
Elkin	3.60	3.20	3.60	3.20
Elm City	2.10	2.60	3.20	2.60
Fair Bluff	1.60	3.80	2.40	3.80
Fayetteville	1.80	3.00	3.00	3.00
Forestville	2.85	3.00	3.80	3.06
Gastonia	3.00	3.56	3.36	3.50
Gibson	2.10	3.50	3.50	3.50
Goldsboro	1.80	2.80	3.20	2.80
Greensboro	2.96	3.00	3.40	3.00
Hamlet	2.00	3.00	3.60	3.00
Henderson	2.95	3.00	3.80	3.00
Hickory	3.20	3.60	3.85	3.60
High Point	3.00	3.08	3.40	3.08
Hillsboro	2.88	2.88	2.68	2.88
Kernersville	3.00	3.00	3.40	3.00
Kinston	2.40	2.50	3.50	2.50
Laurel Hill	1.90	2.40	3.80	3.40
Laurinburg	1.90	3.40	3.80	3.40
Liberty	2.72	3.60	3.80	3.60
Louisburg	2.95	3.00	3.80	3.00
Lumberton	1.60	3.60	3.70	3.60
Macon	3.05	3.00	3.85	3.00
Madison	3.10	3.00	3.00	3.00
Matthews	2.60	3.20	3.20	3.20
Maxton	1.80	3.40	3.00	3.40
Milton	3.44	2.40	4.00	2.40
Mocksville	3.36	3.20	3.40	3.20
Morven	2.55	3.60	2.50	3.60
Mount Airy	2.20	3.40	3.80	3.40
Nashville	2.30	2.90	3.40	2.90
New Bern	1.80	1.75	3.95	1.79
Norwood	3.68	3.20	3.20	2.23
Oxford	3.04	2.83	3.80	2.85
Pineville	2.77	3.25	3.00	3.20
Pittsboro	2.60	3.30	4.10	3.30
Polkton	2.40	3.00	2.20	3.00
Raleigh	2.56	2.83	3.63	2.83
Reidsville	3.00	2.96	3.40	2.36
Rockingham	2.10	3.00	3.80	3.00
Rocky Mount	2.20	2.50	3.40	2.50
Ruffin	3.28	2.80	3.40	2.20
Rural Hall	3.28	3.20	3.60	3.20
Rutherfordton	3.05	3.65	3.40	3.65
Salisbury	3.25	3.20	3.20	3.20
Sanford	2.10	3.00	3.40	3.00
Selma	2.40	2.80	3.20	2.80
Shelby	2.95	3.60	3.40	3.60
Siler City	2.60	3.60	3.80	3.60
Smithfield	2.20	2.80	3.20	2.80
Statesville	3.50	3.20	3.60	3.20
Stem	2.95	2.83	3.80	2.83
Tarboro	2.30	2.40	3.00	2.40
Waco	2.90	3.60	3.40	3.60
Wadesboro	2.30	3.00	2.50	3.00
Walnut Cove	3.12	3.00	3.40	3.00
Warrenton	3.05	3.25	4.10	3.25
Warsaw	1.50	3.00	3.20	3.00
Washington	1.50	1.50	2.25	1.50
Weldon	2.55	1.90	3.85	1.90
Wilson	2.00	2.60	3.20	2.60
Winston-Salem	3.00	3.00	3.40	3.05

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1905.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphate Acid.					Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Potash.		
					Reverted Phosphate Acid.	Available Phosphate Acid.	Water-Soluble Phosphate Acid.	Water-Soluble Ammonia.							
MIXED FERTILIZERS.															
Brands claiming															
4612	American Agricultural Chemical Co., New York.	Zell's Bone Superphosphate.	Lexington	R	5.20	2.65	8.00	.48	1.48	2.00	1.00	\$14.90			
4666	Baugh & Sons Co., Norfolk, Va.	Baugh's Raw Bone Superphosphate and Ammoniated Dissolved Animal Bone.	Concord	R	6.18	2.72	8.90	.76	1.62	2.38	1.26	17.25			
4687	Reidsville Fertilizer Co., Reidsville, N. C.	Banner Fertilizer.	Reidsville	R	4.83	3.21	8.04	.77	1.03	1.80	1.32	14.63			
4610	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Guano.	Lexington	D	4.90	2.55	7.45	.66	1.48	2.14	1.35	15.25			
4665	do	Old Dominion Standard Raw Bone Soluble Guano.	Ashboro	R	5.60	2.71	8.31	.72	1.30	2.02	.91	15.15			
4588	do	Travers' Beef, Blood and Bone Fertilizer.	Wilkesboro	R	5.33	3.29	8.62	.70	1.20	1.90	1.00	15.13			
4641	do	Va. State Fertilizer Co.'s Highland King.	Centerville	R	6.15	2.74	8.89	.68	1.16	1.84	1.50	15.72			
Brand claiming															
4597	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	Mt. Airy	R	5.90	2.45	8.00	.94	1.70	2.00	1.50	15.45			
Brands claiming															
4642	Acme Mfg. Co., Wilmington, N. C.	Acme Special Grain Fertilizer.	Rural Hall	R	6.68	2.04	8.72	.06	1.98	2.04	1.88	16.65			
4725	do	Gem Fertilizer	Mt. Olive	R	6.50	1.93	8.43	.06	1.84	1.90	1.96	16.01			
4698	American Fertilizer Co., Norfolk, Va.	Bone and Peruvian Guano.	Monroe	R	7.20	1.60	8.80	.84	1.10	1.94	2.67	17.26			
4608	American Agricultural Chemical Co., New York.	Lazaretto Crop Grower	Lexington	R	5.88	2.66	8.54	.82	1.34	2.16	1.92	16.93			
4667	Armour Fertilizer Works, Baltimore, Md.	Armour General Fertilizer	Concord	R	4.78	1.62	6.40	.98	1.36	2.34	2.57	16.31			
4639	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Bone and Potash Compound.	Winston	R	3.60	5.08	8.68	.82	1.44	2.26	2.67	18.21			
4743	Bradley Fertilizer Co., Boston, Mass.	Bradley's Cereal Fertilizer	Concord	R	6.35	2.87	9.22	1.28	.88	2.16	2.43	18.10			
4681	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Fertilizer	Statesville	D	8.45	1.56	8.01	.30	1.88	2.18	2.24	16.87			
4733	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Siler City	D	5.05	2.10	7.15	.49	1.80	2.29	2.57	16.82			
4734	Listers' Agricultural Works, Newark, N. J.	Listers' Success Fertilizer	Siler City	R	5.40	2.59	7.99	.44	1.60	2.04	2.13	16.26			

	MacMurphy, W. C. Co., Charleston, S. C.	Special Cotton and Corn Guano	Wadesboro	R	5.85	2.67	8.52	1.04	1.00	2.04	1.99	16.59
4700	Navassa Guano Co., Wilmington, N. C.	Navassa Grain Fertilizer	Lexington	R	4.38	4.11	8.49	.86	1.42	2.28	1.90	17.25
4653	Patapsco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano	Concord	S	6.35	2.47	8.82	1.44	1.07	2.51	2.26	18.71
4670	Pocomoke Guano Co., Norfolk, Va.	Pamlico Superphosphate	Lexington	R	6.40	2.19	8.59	.68	1.44	2.12	2.06	16.99
4614	Pocomoke Guano Co., Norfolk, Va.	Premium Brand Fertilizer	Monroe	R	3.53	4.98	8.51	.52	1.78	2.30	1.64	17.05
4937	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Special Wheat Fertilizer	Kings Mountain	R	5.85	2.11	7.96	1.06	.98	2.04	2.09	16.19
4713	Swift Fertilizer Works, Atlanta, Ga.	Swift's Golden Grade Guano	Rural Hall	R	5.48	2.89	8.37	.70	1.40	2.10	2.57	17.29
4623	do	Swift's Red Steer Guano	Wilkesboro	R	6.35	3.11	9.45	.78	1.62	2.40	2.75	19.46
4596	do	Allison & Addison's Anchor Brand Fertilizer	Concord	R	4.05	5.08	9.13	1.34	.90	2.24	1.72	17.50
4671	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano	Lexington	R	3.85	3.61	7.46	.52	1.56	2.08	2.25	16.05
4613	do	Old Dominion Guano Co.'s Soluble Guano	Lexington	R	6.33	2.27	8.60	1.02	1.06	2.08	1.92	16.72
4609	do	Powers, Gibbs & Co. Eagle Brand Ammoniated Guano	Reidsville	R	8.85	1.72	10.57	.90	.86	1.76	2.04	17.57
4686	do	Southern Chemical Co.'s Electric Standard Guano	Centerville	R	4.08	3.72	7.80	.40	1.86	2.26	2.02	16.70
4640	do	Southern Chemical Co.'s Electric Tobacco Guano	Walnut Cove	R	6.50	1.74	8.24	1.40	.92	2.32	2.34	17.65
4680	do	Tinsley & Co.'s Stonewall Tobacco Guano	Stokesdale	R	5.80	2.12	7.92	.90	1.50	2.40	2.36	17.64
4679	do	do	do	R	5.80	2.12	7.92	.90	1.50	2.40	2.36	17.64
	Brands claiming	do	do	R	5.80	2.12	7.92	.90	1.50	2.40	2.36	17.64
4668	Listers' Agricultural Chemical Works, Newark, N. J.	Listers' Ammoniated Dissolved Bone Phosphate	Concord	R	5.35	2.94	8.24	1.64	1.02	2.66	2.15	18.60
4663	Navassa Guano Co., Wilmington, N. C.	Ammoniated Soluble Navassa Guano	Greensboro	R	5.70	2.94	8.64	.54	2.04	2.58	2.01	18.50
	Brand claiming	do	do	R	5.70	2.94	8.64	.54	2.04	2.58	2.01	18.50
4699	Grow Brothers, Monroe, N. C.	Grow Brothers' High Grade Wheat Fertilizer	Monroe	D	6.83	2.12	8.00	.24	2.04	2.00	3.00	17.10
	Brands claiming	do	do	D	6.83	2.12	8.00	.24	2.04	2.00	3.00	17.10
4582	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Planters Pride	Wilkesboro	R	7.63	.96	8.59	.40	1.55	2.38	3.17	19.07
4685	Powhatan Chemical Co., Richmond, Va.	White Leaf Tobacco Fertilizer	Reidsville	R	4.78	3.45	8.23	.86	2.04	2.90	3.84	21.20
	Brand claiming	do	do	R	4.78	3.45	8.23	.86	2.04	2.90	3.84	21.20
4729	Armour Fertilizer Works, Wilmington, N. C.	Armour's Berry King Fertilizer	Clinton	R	6.03	3.13	9.21	1.67	.74	2.50	4.00	19.85
	Brand claiming	do	do	R	6.03	3.13	9.21	1.67	.74	2.50	4.00	19.85
4712	Acme Mfg. Co., Wilmington, N. C.	Acme Fertilizer	Charlotte	R	7.10	1.78	8.88	.52	2.48	3.00	2.49	20.63
	Brands claiming	do	do	R	7.10	1.78	8.88	.52	2.48	3.00	2.49	20.63
4728	Armour Fertilizer Works, Wilmington, N. C.	Armour's Cotton Special Fertilizer	Clinton	R	6.70	2.23	8.93	.56	.86	2.44	2.75	19.11
4696	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid Guano	Concord	R	5.55	2.68	8.23	1.58	1.80	3.93	3.29	22.18
4726	Va.-Car. Chemical Co., Richmond, Va.	Norfolk and Carolina Chem. Co.'s Amazon High Grade Manure	Faison	R	5.93	2.21	8.14	1.52	1.70	3.22	4.17	22.54

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1905—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Potash.				
MIXED FERTILIZERS.															
4652	Brand claiming Ashepool Fertilizer Co., Charleston, S. C.	Ashepool Wheat and Oat Specific.	Lexington	D	5.40	4.26	9.00	9.66	.94	.98	2.00	1.00	\$15.80	16.50	
4724	Brands claiming Acme Mfg. Co., Wilmington, N. C.	Acme Cotton Grower	Mt. Olive	D	7.78	1.93	9.00	9.71	.82	1.78	2.75	2.00	19.38	19.88	
4727	Va.-Car. Chemical Co., Richmond, Va.	Prolific Cotton Grower	Faison	R	7.00	2.10	9.10	9.10	.63	2.04	2.67	2.25	19.52	19.52	
4664	Brand claiming Swift Fertilizer Works, Atlanta, Ga.	High Grade Swift's Blood and Bone Potash Guano.	Greensboro	R	7.35	2.18	9.25	9.53	.60	3.10	4.00	7.00	29.23	30.95	
4619	Brand claiming Armour Fertilizer Works, Baltimore, Md.	Armour's Ammoniated Bone Meal.	Winston	R	5.70	6.30	11.00	12.00	.96	1.14	2.00	1.00	16.50	17.73	
4650	Brand claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Pure Dissolved Animal Bone.	Rural Hall	S	3.13	11.95	13.00	15.08	1.58	1.60	2.50	1.89	19.95	24.07	
4601	Brand claiming N. C. Acme Manufacturing Co., Wilmington.	Acme Bone and Potash.	Mt. Airy	R	4.48	4.11	8.00	8.59				2.00	9.40	9.81	
4690	Brands claiming Navassa Guano Co., Wilmington, N. C.	Warlick's Mixture	Reidsville	R	8.08	2.76	8.00	10.84				2.25	9.67	11.75	
4690	Va.-Car. Chemical Co., Richmond, Va.	Solid South	Mt. Airy	R	4.80	3.48	8.00	8.28				2.00	9.65	9.65	
4736	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s McGrady's Diamond Bone and Potash Mixture.	Siler City	R	6.90	2.57	8.00	9.47				3.00	10.50	11.41	
4707	Brands claiming Richmond Guano Co., Richmond, Va.	Tip-Top Bone and Potash	Monroe	R	5.33	3.67	8.00	9.00				4.00	11.60	11.73	
4692	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Mt. Airy	D	2.90	5.28	8.00	8.18				3.30	11.68	11.68	
4625	Swift Fertilizer Works, Atlanta, Ga.	Swift's Plantation Standard Grade Phosphate and Potash.	Elkin	R	5.25	5.23	10.48	10.48				3.76	13.57	13.57	
4599	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Carr's Special Wheat Grower.	Mt. Airy	S	4.05	4.50	8.55	8.55				3.57	11.62	11.62	

4629	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Miller's Special Wheat Mixture.	Elkin	S	4.53	4.97	9.50	3.56	12.47
Brands claiming									
4692	Union Guano Co., Winston, N. C.	Rockingham Bone and Potash.	Reidsville	D	3.75	4.20	8.50	2.00	9.85
4589	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Dissolved Bone and Potash.	Wilkesboro	R	5.35	3.80	7.95	2.00	9.35
Brands claiming									
4656	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Quick Step Soluble Bone and Potash.	Kernersville	D	5.45	5.19	10.00	1.00	10.10
Brands claiming									
4688	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Great Wheat and Corn Grower.	Roxboro	R	4.63	6.62	10.00	1.50	10.65
Brands claiming									
4717	Atlantic Chemical Co., Norfolk, Va.	Atlantic Bone and Potash Mixture.	Kings Mountain.	R	7.43	2.72	10.15	2.00	11.20
4586	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Electric Bone and Potash Mixture.	Wilkesboro	R	6.55	3.52	10.07	2.29	11.58
4718	Columbia Guano Co., Norfolk, Va.	Columbia Bone and Potash Mixture.	Kings Mountain.	R	7.50	2.87	10.37	1.71	11.21
4189	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone and Potash.	Reidsville	R	8.23	2.91	11.14	1.64	11.83
4716	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Kings Mountain	R	7.70	3.47	10.17	2.00	11.35
4626	Swift Fertilizer Works, Atlanta, Ga.	Swift's Wheat Grower Standard Grade Phosphate and Potash.	Rural Hall	R	5.60	5.31	10.91	2.33	12.38
4654	Union Guano Co., Winston, N. C.	Union Bone and Potash.	Lexington	D	9.60	.50	10.10	2.04	11.33
4624	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s High Grade Alkaline Bone.	Rockford	D	4.90	6.62	11.52	1.73	12.27
4703	----do	Davie & Whittle's Owl Brand Acid Phosphate with Potash.	Pilot Mountain.	D	5.28	5.36	10.64	1.66	11.40
4627	----do	Durham Fertilizer Blue Ridge Wheat Grower.	Salisbury	D	6.43	4.52	10.91	1.97	11.99
Brands claiming									
4674	Baugh & Sons Co., Norfolk, Va.	Norfolk and Car. Chem. Co.'s Norfolk Bone and Potash.	Elkin	R	4.48	5.60	10.08	1.90	11.16
4673	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Randolph's High Grade Bone and Potash.	Ashboro	R	3.70	6.85	10.55	3.00	12.30
Brands claiming									
4738	Acme Mfg. Co., Wilmington, N. C.	Morris & Scarboro Special Bone and Potash Mixture.	do	S	6.88	4.53	11.41	2.78	13.33
4739	Baugh & Sons Co., Norfolk, Va.	Acme Bone and Potash Mixture.	Liberty	D	7.85	3.07	10.00	4.00	13.40
4708	Crow Brothers, Monroe, N. C.	Baugh's High Grade Potash Mixture.	do	R	4.25	5.75	10.00	3.62	13.81
4704	Pocomoke Guano Co., Norfolk, Va.	Crow Bros.' High Grade Grain Mixture.	Monroe	R	5.95	2.04	8.04	3.86	13.25
4675	Union Guano Co., Winston, N. C.	Pocomoke Bone and Potash Mixture.	Norwood	D	6.60	3.88	10.48	6.22	14.08
		Quaker Grain Mixture	Ashboro	D	6.28	4.19	10.47	4.41	14.28
								4.09	13.92

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1905—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.								Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Potash.		
MIXED FERTILIZERS.													
4705	Brand claiming Pocomoke Guano Co., Norfolk, Va.	Alkali Bone	Norwood	D	6.73	4.19	11.00	10.92				2.00	\$12.10
4737	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Reaper Grain Application.	Liberty	R	10.10	2.79	12.00	12.89				3.10	15.01
RAW OR UNMIXED FERTILIZER MATERIALS.													
4684	Brands claiming Richmond Guano Co., Richmond, Va.	Old Homestead Dissolved Bone	Mocksville	R	6.28	3.96	10.00	10.24					8.00
4632	Union Guano Co., Norfolk, Va.	Union 10 Per Cent Acid Phosphate.	Rural Hall	N	7.28	3.52	10.80	10.80					8.64
4634	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand Acid Phosphate.	Rockford	R	2.63	7.97	10.60	10.60					8.48
4606	do	Durham Fertilizer Co.'s Durham Acid Phosphate.	Pilot Mountain	D	2.20	7.90	10.10	10.10					8.08
4594	do	Southern Chemical Co.'s Horse Shoe Brand Acid Phosphate.	Wilkesboro	D	6.80	4.65	11.45	11.45					9.16
4682	Brands claiming Royster, F. S., Guano Co., Norfolk, Va.	Royster's XX Acid Phosphate.	Advance	D	7.98	4.37	12.00	12.35					9.60
4648	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate.	Winston	D	6.48	5.75	12.23	12.23					9.78
4647	Brands claiming Armour Fertilizer Works, Baltimore, Md.	Armour's 13 Per Cent Acid Phosphate.	Winston	R	10.38	3.66	13.00	14.04					10.40
4661	Ashepool Fertilizer Co., Charleston, S. C.	Ashepool High Grade Acid Phosphate.	Lexington	D	10.58	3.87	14.45	14.45					11.56
4636	Columbia Guano Co., Norfolk, Va.	Columbia High Grade Dissolved Bone.	Elkin	N	7.25	6.37	13.57	13.57					10.86
4591	Etivan Fertilizer Co., Charleston, S. C.	Diamond Soluble Bone	do	R	9.83	3.54	13.37	13.37					10.70
4660	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Dissolved Bone.	Lexington	D	4.33	8.20	12.53	12.53					10.02

4592	Richmond Guano Co., Richmond, Va.	Premium Dissolved Bone	Wilkesboro	R	8.73	4.56	13.39	10.71
4590	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade Dissolved Bone.	Elkin	D	9.58	4.24	13.82	11.06
4620	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's I. X. L. Acid Phosphate.	Lexington	R	6.43	7.01	13.44	10.75
4659	do	Davie & Whittle's Owl Brand High Grade Acid Phosphate.	Lexington	D	7.58	6.93	14.51	11.61
4616	do	Durham Fertilizer Co.'s Double Bone Phosphate; Extra Strong.	Lexington	R	6.58	6.65	13.23	10.58
4621	do	Old Dominion Guano Co.'s High Grade Bone Phosphate.	Lexington	R	8.30	5.60	13.90	11.12
4595	do	S. W. Travers' Standard S. C. Dissolved Bone.	Wilkesboro	R	7.68	7.03	14.71	11.77
4723	do	Va. State Fert. Co.'s Clipper Brand Acid Phosphate.	Hickory	D	8.98	6.09	14.07	11.26
Brands claiming								
4730	Acme Mfg. Co., Wilmington, N. C.	Acme High Grade Acid Phosphate.	Mt. Olive	D	10.73	3.28	14.00	11.20
4617	American Agricultural Chemical Co., New York.	Lazaretto Dissolved Bone	Lexington	R	11.93	3.31	15.24	11.21
4658	Ashepool Fertilizer Co., Charleston, S. C.	Ashepool XXXX Acid Phosphate.	Lexington	D	11.33	4.25	15.58	12.46
4720	Atlantic Chemical Co., Norfolk, Va.	Atlantic 14 Per Cent Acid Phosphate.	Kings Mountain.	R	11.48	3.55	15.03	12.02
4710	Crow Bros., Monroe, N. C.	Crow Brothers' Acid Phosphate.	Monroe	R	11.68	3.12	14.80	11.84
4741	Navassa Guano Co., Wilmington, N. C.	Navassa 14 Per Cent Acid Phosphate.	Siler City	D	11.63	2.79	14.42	11.54
4653	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate.	Advance	D	11.03	3.67	14.70	11.76
4653	Swift Fertilizer Works, Atlanta, Ga.	Swift's Cultivator High Grade Acid Phosphate.	Rockford	D	10.83	4.69	15.52	12.42
4711	Va.-Car. Chemical Co., Richmond, Va.	V. C. C. Co.'s 14 Per Cent Acid Phosphate.	Wadesboro	R	11.90	3.02	14.92	11.94
Brands claiming								
4721	Atlantic Chemical Co., Norfolk, Va.	Atlantic 16 Per Cent Acid Phosphate.	Kings Mountain.	R	13.10	3.16	16.26	12.80
4592	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	16 Per Cent Acid Phosphate	Wilkesboro	R	11.63	4.02	15.65	12.52
4635	Union Guano Co., Winston, N. C.	Union 16 Per Cent Acid Phosphate.	Elkin	D	10.55	5.52	16.07	12.86
4622	Va.-Car. Chemical Co., Richmond, Va.	V. C. C. Co.'s 16 Per Cent Acid Phosphate.	Lexington	R	11.03	5.86	16.89	13.51
Brands claiming								
4731	Acme Mfg. Co., Wilmington, N. C.	Pure German Kainit	Mt. Olive	S			12.00	12.00
4732	Va.-Car. Chemical Co., Richmond, Va.	Genuine German Kainit.	Faison	S			11.94	11.94
Brands claiming								
4637	Lee, A. S., & Son, Richmond, Va.	Lee's Prepared Agricultural Lime.	Rockford	R			12.04	12.04
							2.00	2.00
							2.01	2.01

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1905—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Potash.	Relative Value per Ton at Factory.
				Mechanical Condition.	Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.					
RAW OR UNMIXED FERTILIZER MATERIALS.															
4662	Brand claiming Swift & Co., Chicago, Ill.	Swift's Pure Bone Meal	Kernersville	D									3.00		\$27.66
4607	Brand claiming Union Guano Co., Winston, N. C.	Union Raw Bone Meal	Pilot Mountain	S									3.50		130.57
4651	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	V. C. Co.'s Pure Raw Bone	Rural Hall	S									4.50		130.60
4742	Brand claiming Smith-Davis Co., Wilmington, N. C.	Genuine Peruvian Guano	Statesville	R									5.30		131.09
													3.60	4.25	
													3.42	4.13	

* Total Phosphoric Acid found, 26.30, valued at 3½ cents per pound.

† Total Phosphoric Acid found, 21.75, valued at 3½ cents per pound.

N, D, R, S, E, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

‡ Total Phosphoric Acid found, 21.05, valued at 3½ cents per pound.

§ Total Phosphoric Acid found, 21.80, valued at 3½ cents per pound.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.
					Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.	

MIXED FERTILIZERS.

Brands claiming															
5077	American Agricultural Chemical Co., New York.	Zell's Animal Bone Super-phosphate.	Wilson	R	4.78	3.51	8.00	.54	1.68	2.00	1.00	---	---	---	\$14.90
4763	Baugh & Sons Co., Norfolk, Va.	Baugh's Double Eagle	Aurora	D	7.00	1.80	8.80	.58	1.82	2.40	1.27	---	---	---	17.24
5082	Navassa Guano Co., Wilmington, N. C.	Navassa Complete Fertilizer	Long Creek	S	7.12	1.56	8.68	1.38	.99	2.37	1.64	---	---	---	17.43
5362	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Guano for Cotton	Burlington	R	6.48	1.57	8.05	.88	1.00	1.88	1.25	---	---	---	14.82
5308	Royster, F. S., Guano Co., Norfolk, Va.	Special Registered Compound	Winton	R	6.90	1.65	8.55	1.04	.70	1.74	1.00	---	---	---	14.53
5272	Union Guano Co., Winston, N. C.	Quality and Quantity Guano	Lexington	R	5.98	1.37	7.35	.82	2.26	2.58	1.03	---	---	---	16.26
5071	Virginia-Carolina Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Guano.	Wilson	S	6.05	2.44	8.49	.96	1.58	2.54	1.39	---	---	---	17.55
4801	---do---	Davie & Whittle's Owl Brand Guano No. 2.	Greenville	R	6.88	2.07	8.95	.44	1.72	2.16	1.35	---	---	---	16.67
5271	---do---	Durham Ammoniated Fertilizer.	Lexington	R	6.43	1.57	8.00	.32	1.90	2.20	1.42	---	---	---	16.02
5307	---do---	Durham Progressive Farmer Guano.	Ahoskie	R	6.03	2.94	8.97	.58	1.48	2.06	2.01	---	---	---	17.08
5080	---do---	Old Dominion Standard Raw Bone Soluble Guano.	Autreyville	R	5.20	3.02	8.22	.90	1.04	1.94	1.09	---	---	---	14.99
5012	---do---	Queen of the Harvest	Goldsboro	R	6.95	2.50	9.45	.26	2.16	2.42	2.00	---	---	---	18.69
5368	---do---	Southern Chemical Company's Tinsley Complete Fertilizer.	Wilkesboro	R	6.08	3.41	9.49	.52	1.36	1.88	.96	---	---	---	18.80
5285	---do---	Tinsley & Co.'s Richmond Brand Guano.	Rural Hall	R	5.95	2.32	8.23	.26	1.56	1.82	1.23	---	---	---	14.76
4997	---do---	Travers & Co.'s Beef, Blood and Bone Fertilizer.	Washington	R	2.60	4.80	7.40	1.10	1.28	2.38	1.27	---	---	---	15.91
Brands claiming															
4763	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	Elizabeth City	R	5.38	2.32	7.70	1.70	2.50	4.20	1.50	---	---	---	15.45
4833	Imperial Company, Norfolk, Va.	Imperial Cotton Grower	Edenton	S	4.38	3.21	7.59	.78	1.50	2.28	2.59	---	---	---	22.14

N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphate Acid.	Reverted Phosphate Acid.	Available Phosphate Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.																
4938	Brand claiming Armour Fertilizer Works, Wilmington, N. C.	Armour's King Cotton Fertilizer.	Trenton	R	7.00	1.37	8.00	1.30	1.13	2.50	1.00					\$16.55
4981	Brand claiming Virginia-Carolina Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Raw Bone Superphosphate.	Fremont	R	5.83	2.22	8.00	.68	1.86	2.54	1.74					17.10
4839	Brands claiming Acme Manufacturing Co., Wilmington, N. C.	Cotton-seed Meal Guano.	Bethel	R	6.98	1.96	8.00	.43	1.88	2.36	2.53					17.54
5121	do American Fertilizer Co., Norfolk, Va.	Gem Fertilizer	Fremont	R	7.05	1.66	8.71	.24	1.86	2.10	2.12					18.62
4832	do	American Cotton Compound	Columbia	R	5.05	3.59	8.64	.76	1.46	2.22	2.47					17.10
4897	do	Bone and Peruvian Guano	Clinton	S	7.20	1.78	8.98	1.16	1.18	2.34	2.29					18.32
4814	American Agricultural Chemical Co., New York.	Triumph Soluble Guano	Hamilton	S	4.79	2.82	7.61	.62	1.48	2.10	2.06					16.04
5352	do	Detrick's Fish Mixture	Clayton	R	4.48	3.55	8.03	1.00	.84	1.84	1.77					15.24
5038	do	Purity Guano	Edenton	R	3.08	5.16	8.24	.58	1.50	2.08	1.93					16.40
5192	do	Zell's Calvert Guano	Benson	S	4.80	3.35	8.15	.67	1.44	2.11	1.86					16.34
5119	do	Zell's Fish Guano	Fremont	R	3.48	2.67	8.06	1.86	1.30	3.16	2.07					16.93
4885	Armour Fertilizer Works, Baltimore, Md.	Armour's General Fertilizer	Washington	R	6.10	2.42	8.52	.98	1.12	2.10	2.20					17.02
5037	Arps, George L. & Co., Norfolk, Va.	High Grade Premium Guano for Cotton, Tobacco, etc.	Edenton	R	6.05	2.01	8.06	1.02	1.20	2.22	2.09					16.87
5002	Atlantic Chemical Co., Norfolk, Va.	Atlantic Soluble Guano	Lumberton	R	7.18	1.29	8.47	.92	1.14	2.06	2.05					16.67
5246	Bailey, J. L. & Co., Elm City, N. C.	Stag Brand Guano	Elm City	R	3.73	3.24	6.97	.70	1.54	2.24	2.28					16.17
4760	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Bone and Potash Compound.	Washington	R	6.48	2.02	8.50	.72	1.68	2.40	2.29					18.09
5099	do	Baugh's Fish Mixture	Center Hill	R	6.03	2.19	8.22	.98	.94	1.92	2.48					16.46
5206	Berkley Chem. Co., Norfolk, Va.	Brandon Superphosphate	Spring Hope	R	7.03	1.93	8.96	.62	1.50	2.12	2.03					17.25

4788	Bragaw, Wm. & Co., Washing- ton, N. C.	Old Reliable Premium High Grade for all crops.	Washington, -----do-----	R	5.10	2.85	7.95	.56	1.74	2.30	2.00	16.94
4782	do	Tar Heel Special Guano for all crops.	-----do-----	R	5.20	2.71	7.91	.76	1.78	2.54	2.31	18.04
5023	Burton, C. J., Guano Co., Balti- more, Md.	Burton's Butcher Bone	Wilson	R	5.65	2.37	8.02	1.02	1.02	2.04	2.20	16.37
4898	Caraleigh Phosphate and Fertil- izer Works, Raleigh, N. C.	Eli Ammoniated Fertilizer	Clinton	R	7.93	1.23	9.16	.76	1.18	1.94	2.04	16.89
4806	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano.	Hamilton	R	5.40	2.88	8.28	.70	1.52	2.22	1.98	16.96
5228	Crow Fertilizer Co., Monroe, N. C.	Crow's Union Co. Special Cot- ton Fertilizer.	Monroe	R	6.63	2.02	8.65	.54	1.88	2.42	2.60	18.63
5259	Eureka Fertilizer Co., Perryville, Md.	Farmer's Favorite Bone Phos- phate.	Elizabeth City	S	4.00	4.10	8.10	.86	.74	1.60	3.00	15.87
5383	Etiwan Fertilizer Co., Charles- ton, S. C.	Plow Brand Ammoniated Fer- tilizer.	Waco	S	6.50	2.49	8.39	1.68	.86	2.54	2.18	18.33
5312	Farmers Cotton Oil Co., Wilson, N. C.	Crop King Guano	Lucama	R	6.25	1.29	7.54	.24	1.84	2.08	2.12	15.98
5208	Farmers Guano Co., Raleigh, N. C.	Farmer's Special Guano.	Spring Hope	R	6.55	1.52	8.07	.80	1.54	1.84	2.00	15.53
5088	Hadley, Harris & Co., Wilson, N. C.	State Standard Guano	Roseboro	R	5.93	1.29	7.22	.44	1.66	2.10	2.33	15.99
5015	Hadley, Harris & Co., Wilson, N. C.	Hadley's High Grade Plant Food.	Wilson	R	6.43	1.79	8.22	.42	1.44	1.86	3.35	17.22
5039	Hampton Guano Co., Norfolk, Va.	Shirley's Superphosphate	Edenton	S	6.30	1.51	7.81	.74	1.38	2.12	2.00	16.22
4805	Harrell, S. B. & Co., Norfolk, Va.	Harrell's Champion Cotton and Peanut Grower.	-----do-----	R	6.15	3.39	9.54	.68	1.54	2.22	2.04	18.13
4909	Hubbard Fertilizer Co., Balti- more, Md.	Hubbard's Exchange Guano	New Bern	R	3.68	3.55	7.23	1.24	.90	2.14	2.24	16.03
4764	Imperial Company, Norfolk, Va.	Imperial Champion Guano	Edenton	R	4.65	3.12	7.77	.60	1.58	2.18	1.96	16.34
5128	do	Imperial Cisco Soluble Guano	-----do-----	S	5.30	2.49	7.79	.72	1.28	2.20	2.30	16.80
5256	do	Imperial Peanut and Corn Guano.	do	R	7.10	2.15	9.25	.66	1.34	2.60	1.65	16.73
5227	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Success Fertilizer	Monroe	S	4.85	3.35	8.20	.74	1.38	2.12	2.01	16.58
5283	Martin, D. B. Co., Philadelphia, Pa.	Martin's Carolina Cotton Fer- tilizer.	Jonesboro	S	1.03	7.19	8.22	.98	.88	1.86	2.01	15.74
4828	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Cotton Guano	New Bern	R	5.68	2.89	8.57	.54	1.76	2.30	2.13	18.63
5112	Miller Fertilizer Co., Baltimore, Md.	Ammoniated Dissolved Bone	Wilson	R	3.83	3.91	7.74	1.22	1.04	2.26	2.46	17.13
4976	Navassa Guano Co., Wilmington, N. C.	Navassa Guano	Kinston	R	5.98	2.68	8.66	1.04	1.26	2.30	2.20	17.80
4969	do	Navassa Cotton-seed Meal Guano.	Cerro Gordo	R	6.48	1.84	8.32	.02	2.10	2.12	2.28	16.99
4934	New Bern Cotton Oil and Fertil- izer Mills, New Bern, N. C.	Craven Cotton Guano	Jacksonville	S	7.80	1.09	9.49	.26	1.54	1.80	2.32	17.03
4959	do	Greene County Standard Fert.	-----do-----	R	7.08	1.53	8.61	1.84	2.12	3.96	4.09	25.31
5081	N. C. Cotton Oil Co., Henderson, N. C.	Henderson Cotton Fertilizer	Wake Forest	D	6.20	1.95	8.15	.24	2.02	2.26	2.72	17.78
5303	do	Vance Cotton Grower	Henderson	R	6.23	2.22	8.45	.54	1.74	2.28	2.40	17.76

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.															
5204	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Cotton Grower	Spring Hope---	D	7.15	2.34	9.49	.24	1.90	2.14	2.39	---	---	---	\$ 18.23
4967	do.	Wilmington Special	Mt. Taber---	R	6.88	2.03	8.91	.04	2.14	2.18	2.55	---	---	---	18.01
5313	Norfolk Fertilizer Co., Norfolk, Va.	Orinoco Cotton Grower	Lucama---	R	6.48	2.10	8.53	.68	1.46	2.14	2.02	---	---	---	16.96
5080	Ober, G. & Sons Co., Baltimore, Md.	Ober's Special Cotton Com-pound.	Wake Forest---	S	7.20	1.37	8.57	.96	1.08	2.04	2.22	---	---	---	16.88
5114	do.	Ober's Standard Tobacco Fert.	Henderson---	R	7.53	1.94	9.47	.86	1.14	2.00	2.15	---	---	---	17.48
5340	Patapsco Guano Co., Baltimore, Md.	Planters' Favorite	Mebane---	R	4.45	3.57	8.02	.88	.84	1.72	1.78	---	---	---	14.85
4944	do.	Sea Gull Ammoniated Guano.	La Grange---	S	5.33	2.78	8.11	.62	1.60	2.22	1.97	---	---	---	16.79
4765	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Bone and Peruvian Mixture.	Edenton---	R	7.35	1.00	8.35	.58	1.54	2.12	2.56	---	---	---	17.33
4766	do.	Piedmont Cultivator Brand	do	S	6.88	1.18	8.06	.62	1.40	2.02	2.77	---	---	---	16.97
4845	do.	Wood's Cotton Grower	Elizabeth City---	R	6.88	1.82	8.40	.84	1.32	2.16	2.77	---	---	---	17.13
4831	do.	Piedmont Fish Guano	Edenton---	R	6.35	1.62	7.97	.60	1.54	2.14	2.63	---	---	---	17.12
5003	do.	Piedmont Special for Cotton, Corn and Peanuts.	Lumberton---	R	6.43	1.80	8.23	.62	1.26	1.88	2.38	---	---	---	16.22
5265	Pine Level Oil Mill Co., Pine Level, N. C.	Oliver Cotton Grower	Selma---	R	6.10	2.20	8.30	.18	1.84	2.02	2.37	---	---	---	16.74
5109	Pocahontas Guano Co., Lynchburg, Va.	Carrington's Banner Brand Guano.	Halifax---	R	5.73	2.10	7.83	.44	1.44	1.88	2.25	---	---	---	15.72
5304	do.	do	Kittrell---	S	6.70	1.44	8.14	1.02	.98	2.00	2.00	---	---	---	16.13
5183	Pocomoke Guano Co., Norfolk, Va.	Electric Crop Grower	Edenton---	S	4.68	3.07	7.75	.88	1.28	2.16	2.00	---	---	---	16.30
4834	do.	L. P. H. Premium	Plymouth---	R	5.98	2.39	8.27	.56	1.86	2.22	1.99	---	---	---	17.05
4783	do.	Pamlico Superphosphate	Washington---	R	5.18	2.68	7.86	.60	1.60	2.20	1.98	---	---	---	16.51
4378	Powhatan Chemical Co., Richmond, Va.	Magic Cotton Grower	Kinston---	R	5.88	2.99	8.87	.44	1.58	2.02	2.12	---	---	---	16.98
5243	do.	Magic Special Fertilizer	Henderson---	S	5.00	2.35	7.35	.92	1.22	2.14	2.55	---	---	---	16.48
5007	Rasin Monumental Co., Baltimore, Md.	Rasin's Empire Guano	Lumberton---	R	7.18	2.19	9.37	.92	1.36	2.28	1.57	---	---	---	17.68
5318	Reidsville Fertilizer Co., Reidsville, N. C.	Champion Guano---	Ashboro---	R	4.18	3.81	7.99	.56	1.34	1.90	2.32	---	---	---	16.01

5302	Richmond Guano Co., Richmond, Va.	Ammoniated Fertilizer	Raleigh	S	4.25	3.22	7.47	.56	1.74	2.30	2.04	16.55
4827	do	Premium Brand Fertilizer	New Bern	R	5.63	2.26	7.89	.62	1.30	1.92	2.39	16.06
5286	do	Premium Tobacco Fertilizer	Sitoun	S	5.43	3.22	8.65	.52	1.10	1.62	2.01	15.34
5110	Rocky Mount Guano Co., Rocky Mount, N. C.	Eagle Guano	Enfield	R	5.68	3.50	9.18	.18	2.04	2.22	2.55	18.39
4823	Royster, F. S., Guano Co., Norfolk, Va.	Farmer's Bone Fertilizer	New Bern	R	7.27	1.20	8.47	1.08	1.04	2.12	1.89	16.70
5168	Southern Cotton Oil Mill, Charlotte, N. C.	Majestic Fertilizer	Charlotte	R	6.20	2.77	8.97	.28	2.02	2.30	2.29	18.18
5136	Southern Cotton Oil Co., Wilson, N. C.	Southern Cotton Oil Company Standard.	Fayetteville	R	6.45	2.48	8.93	.32	1.72	2.04	2.62	17.65
5284	Swift Fertilizer Works; Atlanta, Ga.	Swift's Red Steer Standard Grade Guano.	Winston	S	4.38	3.31	7.69	1.64	.90	2.54	2.82	18.40
5090	Union Guano Co., Winston, N. C.	Old Honesty Guano.	Roseboro	R	6.33	1.94	8.27	.24	2.08	2.32	2.44	17.78
4810	Upshur, R. L., Norfolk, Va.	Upshur's Grain, Grass and Cotton Guano.	Mocksville	S	4.84	2.76	7.60	.84	1.34	2.18	2.35	16.61
4900	Va.-Car. Chemical Co., Richmond, Va.	Ajax Cotton-seed Meal	Clinton	R	4.85	1.63	6.48	.16	2.44	2.60	2.53	17.19
4972	do	Allison & Addison's Old Hickory Guano.	Fair Bluff	R	7.18	1.72	8.90	.90	1.30	2.20	2.13	17.61
4714	do	Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone.	Hickory	R	3.98	3.43	7.41	.46	1.64	2.10	2.04	15.84
4890	do	Charlotte Oil and Fertilizer Co.'s King Cotton Grower.	Creswell	R	5.15	2.60	7.75	.60	1.32	1.92	2.04	15.55
5122	do	Davie & Whittle's Owl Brand Guano.	Fremont	R	7.60	2.85	10.45	.36	2.00	2.36	1.70	19.06
4865	do	Diamond Dust	Mt. Olive	R	6.28	1.97	8.25	.78	1.38	2.16	2.22	16.99
4948	do	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Seven Springs	R	6.95	1.92	8.87	.54	1.74	2.28	2.52	18.27
4748	do	Farmer's Favorite Fertilizer	Edenton	D	6.75	1.77	8.52	.44	1.66	2.10	2.18	17.00
4861	do	Norfolk and Carolina Chemical Co.'s Genuine Slaughter-house Bone Guano.	Mt. Olive	R	6.48	2.19	8.67	.18	1.46	1.64	2.55	16.02
4916	do	Old Dominion Guano Co.'s Farmer's Friend Fertilizer.	Beaufort	R	5.88	2.70	8.58	.34	1.82	2.16	2.18	17.25
4993	do	Old Dominion Guano Co.'s Farmer's Friend Fertilizer.	Hertford	R	5.60	2.40	8.00	1.02	1.14	2.16	2.10	16.63
4773	do	Old Dominion Guano Co.'s Soluble Guano.	Jamesville	R	6.43	1.80	8.23	.44	1.88	2.32	2.17	17.45
5360	do	Old Dominion Guano Co.'s Soluble Tobacco Guano.	Burlington	R	4.93	4.52	8.45	.66	1.34	2.00	2.10	16.52
4899	do	Plant Food	Clinton	R	6.90	2.44	9.34	.26	1.94	2.20	2.36	18.27
4988	do	Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano.	Fremont	R	6.38	3.26	9.64	.14	1.86	2.00	2.07	17.55
4901	do	Powers, Gibbs & Co.'s Eagle Island Ammoniated Guano.	Magnolia	R	6.55	2.28	8.83	.78	1.54	2.32	2.14	17.96

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ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.	
			Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.															
5011	Va-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Electric Standard Guano.	Goldsboro	R	6.83	1.79	8.62	.78	1.42	2.20	2.17	---	---	---	\$ 17.40
4941	do	Tinsley & Co.'s Lee Brand Guano.	La Grange	S	6.83	1.90	8.73	.84	1.36	2.20	2.23	---	---	---	17.56
4848	do	Tinsley & Co.'s Stonewall Guano.	Hamilton	R	5.58	2.21	7.79	.94	1.16	2.10	2.22	---	---	---	16.38
4638	do	Travers Co.'s National Fertilizer.	Centerville	R	4.50	2.82	7.32	.34	1.68	2.02	2.26	2.26	6.10	15.74	
4855	do	Travers Co.'s National Fertilizer.	Warsaw	S	7.03	1.91	8.94	.68	1.26	1.94	3.03	---	---	---	17.78
5177	do	Travers Co.'s National Special Tobacco Fertilizer.	Henderson	R	6.65	1.97	8.62	.54	1.66	2.20	2.00	---	---	---	17.22
5201	do	Virginia State Fertilizer Co.'s High Grade Guano.	Nashville	R	5.98	2.07	8.05	.52	1.18	1.70	2.12	---	---	---	15.19
5117	do	Wilson Standard	Fremont	S	7.23	3.07	10.30	.28	1.74	2.02	1.91	---	---	---	18.03
4971	do	Winston's Special for Cotton	Fair Bluff	R	6.53	1.51	8.04	.41	2.12	2.56	1.97	---	---	---	17.85
4771	Winborne Guano Co., Tynor, N. C.	High Grade Excelsior Guano	Tynor	R	5.83	1.96	7.79	.86	1.22	2.08	2.05	---	---	---	16.13
4770	do	High Grade Eureka Guano	Tynor	R	6.08	2.02	8.10	.78	1.32	2.10	2.19	---	---	---	16.63
4844	do	High Grade Triumph Guano	Hamilton	R	4.88	2.76	7.64	.76	1.28	2.04	2.33	---	---	---	16.17
5333	Brand claiming Read Phosphate Co., Charleston, S. C.	Read's Cotton Flower Fertilizer.	Wadesboro	R	6.68	1.64	8.32	1.50	.84	2.34	1.33	---	---	---	16.67
Brands claiming															
5092	Acme Manufacturing Co., Wilmington, N. C.	Acme Standard Guano	Steadman	S	7.48	1.88	9.36	.98	1.56	2.54	2.33	---	---	---	17.65
4970	do	Lazimeter's Complete Fertilizer	Fair Bluff	R	7.18	1.19	8.37	1.32	1.40	2.72	2.36	---	---	---	19.10
5073	American Agricultural Chemical Co., New York	Lazaretto Universal Compound.	Wilson	R	3.85	2.80	6.65	.78	1.86	2.64	2.17	---	---	---	17.08
5049	Armour Fertilizer Works, Wilmington, N. C.	Armour's King Cotton Fertilizer No. 2.	Chinquapin	R	8.15	2.27	8.42	1.00	1.44	2.44	1.79	---	---	---	17.60
5298	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eclipse Ammoniated Guano.	Raleigh	R	6.25	1.41	7.66	1.14	1.38	2.52	2.43	---	---	---	17.88

5241	Columbia Guano Co., Norfolk, Va.	Columbia High Grade Special Tobacco Guano.	Henderson	R	6.70	1.30	8.00	1.28	1.04	2.32	3.24	3.24	6.70	18.42
5072	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Ammoniated Dissolved Bone.	Wilson	R	4.20	2.87	7.07	.78	1.94	2.72	2.28	---	---	17.85
4904	Navassa Guano Co., Wilmington, N. C.	Ammoniated Soluble Navassa Guano.	Whiteville	R	7.10	1.81	8.91	.94	1.60	2.54	2.05	---	---	18.65
5173	Navassa Guano Co., Wilmington, N. C.	Navassa Guano for Tobacco - Powers, Gibbs & Co.'s Carolina Golden Belt. Ammoniated Guano for all crops.	Louisburg	R	7.05	1.83	8.88	.94	1.58	2.52	2.18	---	5.05	18.70
4902	Va.-Car. Chemical Co., Richmond, Va.	Gibbs & Co.'s High Grade Ammoniated Guano. Virginia State Fertilizer Co.'s G. E. Special Tobacco Grower.	Magnolia	R	6.78	1.97	8.75	.90	1.44	2.34	2.79	---	---	18.66
5070	do	do	Wilson	R	7.28	1.87	9.15	.96	1.48	2.44	2.40	---	---	18.93
5026	do	do	Wilson	R	7.25	1.67	8.92	.88	1.82	2.70	2.15	2.15	3.50	19.30
5225	Brand claiming Va. Richmond Guano Co., Richmond, Va.	Special Premium Brand for Tobacco.	Siloam	S	4.78	4.04	8.00	.52	1.38	2.25	2.25	---	---	17.10
5203	Brand claiming American Fertilizer Co., Norfolk, Va.	Bob White Fertilizer for Tobacco.	Nashville	R	5.95	1.87	8.00	1.16	1.26	2.50	2.50	---	---	16.51
5041	Armour Fertilizer Works, Baltimore, Md.	Armour Champion Fertilizer.	Elizabeth City	S	6.38	1.76	8.14	1.66	.84	2.50	2.42	2.68	2.40	17.97
4979	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows All Crop Guano	Kinston	R	7.03	1.71	8.74	.82	1.68	2.50	2.44	---	---	19.02
4809	Brand claiming Camp, W. H., Petersburg, Va.	Red Head Camp's Prepared Chemicals.	Hookerton	R	3.20	5.05	8.25	2.14	.66	2.75	2.00	---	---	18.80
5126	Farmers Cotton Oil Co., Wilson, N. C.	Wilson High Grade Guano	Williamston	R	6.45	1.56	8.01	.04	2.52	2.56	2.33	---	---	18.47
5006	North Carolina Cotton Oil Co., Raleigh, N. C.	Raleigh Standard Guano	Lumberton	R	7.15	1.09	8.24	.60	2.02	2.62	1.62	---	---	18.22
5083	Va.-Car. Chemical Co., Richmond, Va.	Royal Crown	Rocky Mount	R	6.68	1.76	8.44	.68	1.90	2.58	2.61	---	---	17.84
5014	Brand claiming Hadley, Harris & Co., Wilson, N. C.	Hadley's Boss Guano	Wilson	R	6.70	1.73	8.43	1.12	1.88	2.75	2.50	---	---	18.98
5076	Richmond Guano Co., Richmond, Va.	Carolina Bright Special Tobacco Fertilizer.	do	S	5.23	2.45	7.68	.72	2.00	2.72	2.81	---	---	19.02
5100	Southern Cotton Oil Co., Rocky Mount, N. C.	Southern Cotton Oil Co.'s High Grade.	Plymouth	R	7.08	2.22	9.30	.30	1.84	2.14	2.73	---	---	20.30
5249	Southern Cotton Oil Co., Wilson, N. C.	Southern Cotton Oil Co.'s Cotton-seed Meal.	Elm City	R	8.23	2.48	10.71	.49	1.88	2.37	2.33	---	---	18.43
4966	Va.-Car. Chemical Co., Richmond, Va.	Delta Cotton-seed Meal	Mt. Tabor	R	6.53	1.74	8.27	.64	2.38	3.02	2.75	---	---	20.02
5242	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co. Solid Gold Tobacco Guano.	Henderson	R	6.58	2.08	8.64	.98	1.44	2.75	4.00	---	---	20.43
										2.42	2.86	---	---	20.67
														18.91

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ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.	
			Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Murate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.															
Brands claiming															
5024	Navassa Guano Co., Wilmington, N. C.	Harvest King Guano.	Wilson	R	7.10	1.50	8.00	.86	1.42	2.00	3.00	2.85			\$ 17.10
4883	Pocomoke Guano Co., Norfolk, Va.	Crescent Complete Compound.	Edenton	R	5.78	2.38	8.16	.82	1.42	2.24	3.10				18.15
5028	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s Special 3 PerCent Guano	Autryville	R	7.00	2.32	9.32	.80	2.46	3.26	2.22				21.59
Brands claiming															
5052	Acme Manufacturing Co., Wilmington, N. C.	Tip Top Crop Grower.	Mt. Olive	R	7.10	2.13	9.23	.86	1.78	2.50	3.00	3.07			18.75
4838	do	Tip Top Tobacco Grower.	Bethel	R	7.03	1.97	9.00	1.22	1.42	2.64	3.08	3.08			20.39
5161	American Agricultural Chemical Co., New York.	Canton Chemical Baker's Standard High Grade Guano.	Rockingham	R	7.63	1.39	9.02	.70	1.88	2.58	3.40	3.40			20.27
5332	do	Lazaretto Climax Plant Food.	Gastonia	S	4.55	2.61	7.16	1.10	1.56	2.66	3.07				18.60
5221	American Fertilizer Co., Norfolk, Va.	Johnson's No. 1 Fertilizer for Tobacco.	Benson	R	4.43	3.68	8.11	.76	1.50	2.26	2.73				17.76
5008	Atlantic Chemical Co., Norfolk, Va.	Atlantic Tobacco Grower.	Lumberton	R	5.98	2.46	8.44	1.24	.76	2.00	3.55	3.55			18.10
4785	Bragaw, Wm. & Co., Washington, N. C.	Tuckahoe Tobacco Guano	Washington	S	7.25	1.01	8.26	.90	1.44	2.34	3.08	3.08			18.54
5237	Burton, C. J., Guano Co., Baltimore, Md.	Burton's High Grade Fertilizer.	Greenville	R	5.30	2.14	7.44	.88	1.90	2.78	3.04	3.04			19.21
5207	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh's Special Tobacco Guano.	Spring Hope	R	5.53	2.65	8.18	.64	1.94	2.58	3.02				19.20
5005	do	Planter's Pride	Lumberton	R	7.90	1.55	9.45	.32	2.04	2.36	2.63	2.63			19.18
5258	Eureka Fertilizer Co., Perryville, Md.	Potato Special.	Elizabeth City	R	6.80	2.18	8.98	.70	1.64	2.34	3.94				20.14
5191	Farmers Guano Co., Raleigh, N. C.	Big Crop Guano	Benson	R	3.08	5.28	8.20	.56	1.00	1.56	3.00				15.83
5188	do	Toco Tobacco Guano	Dunn	R	7.33	1.55	8.88	.82	2.34	2.66	3.14				20.22
5022	Imperial Company, Norfolk, Va.	Imperial Guano for Bright Tobacco.	Wilson	R	5.55	2.83	8.38	.32	2.20	3.22	3.22				19.40
				R	4.10	3.42	7.52	1.12	1.54	2.65	2.89	2.89			18.72
4750	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Onslow Farmers' Reliance Guano.	Edenton	R	5.93	2.21	8.14	.90	1.80	2.70	3.15				19.70

4945	Patapasco Guano Co., Baltimore, Md.	Patapasco Special Tobacco Mixture.	La Grange	R	5.45	2.60	8.05	.72	2.08	2.80	3.00	3.00	4.60	19.78
5165	Patapasco Guano Co., Baltimore, Md.	Patapasco Special Tobacco Mixture.	Rocky Mount	R	4.75	2.52	7.27	1.04	1.60	2.64	3.11	3.11	5.30	18.67
5193	do do	Uniform Guano	Benson	R	4.48	3.07	7.55	1.02	1.70	2.72	2.95	2.95	---	19.01
5004	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Guano for all Crops.	Lumberton	R	6.18	2.25	8.43	.70	1.70	2.40	2.83	2.83	---	18.62
5235	do do	Piedmont Guano for Tobacco	Youngsville	R	7.00	1.55	8.55	.72	1.42	2.14	3.02	3.02	3.05	18.08
4888	do do	Privott's Standard Guano	Edenton	R	7.18	1.36	8.54	1.18	1.36	2.54	3.11	3.11	---	19.49
5074	Powhatan Chemical Co., Richmond, Va.	King Brand Fertilizer	Wilson	R	4.40	2.69	7.09	.68	2.16	2.84	2.98	2.98	---	19.03
5400	do do	White Leaf Tobacco Fertilizer	Henderson	S	5.20	2.34	7.54	.78	1.62	2.40	3.22	3.22	5.40	18.25
4825	Richmond Guano Co., Richmond, Va.	Tip Top Fertilizer	New Bern	R	5.88	3.01	8.89	.66	1.88	2.54	2.59	2.59	---	19.23
4800	Royster, F. S., Guano Co., Norfolk, Va.	Orinoco Tobacco Guano	Greenville	R	7.04	1.05	8.09	.56	1.96	2.52	3.16	3.16	6.70	19.07
5089	Union Guano Co., Winston, N. C.	Union Waterfowl Guano	Roseboro	R	6.80	1.47	8.27	.50	2.24	2.74	2.62	2.62	---	19.37
4747	Virginia-Carolina Chemical Co., Richmond, Va.	Blue Star Cotton-seed Meal	Hamilton	R	6.73	1.69	8.42	.30	2.08	2.38	4.38	4.38	---	20.25
4775	do do	Durham Fert. Co.'s N. C. Official Farmers Alliance Guano.	Elizabeth City	R	7.38	1.16	8.54	.50	2.36	2.86	2.98	2.98	---	20.40
5163	do do	Norfolk and Carolina Chem. Co.'s Special Bright Tobacco Fertilizer.	Bethel	R	5.78	1.69	7.47	.96	1.82	2.78	3.75	3.75	3.20	20.02
4949	do do	Old Dominion Osceola Tobacco Guano.	Seven Springs	R	5.98	2.42	8.40	1.16	1.66	2.82	3.56	3.56	3.10	20.78
4794	do do	Superlative Guano	Washington	R	5.48	1.86	7.34	.24	3.68	3.92	3.22	3.22	---	23.08
4848	do do	do do	Fremont	R	6.10	2.62	8.72	.74	1.50	2.24	3.04	3.04	---	18.58
5348	do do	Tinsley & Co.'s Killikinnick Tobacco Mixture.	Hamilton	R	4.78	2.88	7.66	.80	1.70	2.50	3.57	3.57	5.40	19.07
5348	Brand claiming Miller Fertilizer Co., Baltimore, Md.	Special Tobacco Grower	Mt. Olive	R	4.63	3.64	8.00	1.06	.96	2.00	4.00	4.00	9.80	18.20
4984	Brand claiming American Agricultural Chemical Co., New York.	Zells' Victoria Animal Bone Compound.	Fremont	R	6.70	1.95	8.00	.76	1.62	2.25	4.00	4.00	---	19.02
4836	Brands claiming Navassa Guano Co., Wilmington, N. C.	Navassa Strawberry Top-Dressing	Washington	R	5.68	2.43	8.00	.82	2.24	2.50	4.00	4.00	---	19.85
5046	Tuscarora Fertilizer Co., Wilmington, N. C.	Navassa Berry King	Wallace	R	5.31	3.38	8.69	1.26	1.50	2.76	3.88	3.88	---	21.20
4905	Brand claiming Navassa Guano Co., Wilmington, N. C.	Navassa Fruit Grower's Fertilizer.	Whiteville	R	7.03	2.01	8.00	.86	1.44	2.00	6.00	6.00	20.40	20.40
4925	Brand claiming Hubbard Fertilizer Co., Baltimore, Md.	Jersey Trucker—The Planters' Friend.	Washington	R	1.83	4.42	8.00	1.14	.74	2.00	10.00	10.00	---	24.80
							6.25			1.88	9.03	9.03	---	21.76

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5209	do	Atlantic High Grade Tobacco Guano.	Spring Hope	R	6.98	1.70	8.68	1.49	1.02	2.51	3.10	3.10	5.15	19.50
5245	Bailey, J. L. Co., Elm City, N. C.	Elm City	Elm City	R	5.63	3.34	8.37	.48	2.08	2.56	3.07	---	---	19.36
4759	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid High Grade Truck Guano.	Washington	R	6.53	1.65	8.18	1.24	2.10	3.34	3.11	---	---	21.80
5055	do	do	Chadbourne	R	6.13	2.21	8.34	1.32	2.12	3.44	3.22	---	---	22.40
4757	do	Baugh's High Grade Tobacco Guano.	Washington	R	6.58	1.76	8.34	1.10	2.12	3.22	3.33	3.33	5.00	21.79
5391	Berkley Chemical Co., Norfolk, Va.	Berkley Tobacco Guano	Spring Hope	R	6.55	1.75	8.30	1.32	1.74	3.06	2.98	2.98	6.25	20.85
4786	Bragaw, Wm. & Co., Washington, N. C.	Beaufort County Guano	Washington	R	4.98	2.94	7.92	.92	2.28	3.20	3.21	---	---	21.22
5129	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Best	Edenton	S	5.08	3.46	8.54	2.16	.72	2.88	3.35	---	---	20.87
5156	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Tobacco Queen	Enfield	S	5.35	3.50	8.85	2.26	.88	3.14	3.40	3.40	6.90	22.06
5175	do	Horne's Best	Louisburg	S	6.35	1.80	8.15	.48	2.82	3.30	3.16	---	---	21.70
5351	Clayton, Oil Mill, Clayton, N. C.	Clayton Guano	Clayton	R	5.68	1.63	7.31	.70	2.40	3.10	3.46	---	---	20.61
4822	Columbia Guano Co., Norfolk, Va.	Hyco Tobacco Guano	New Bern	R	6.69	1.85	8.54	1.24	1.68	2.92	3.43	3.43	7.25	21.09
5250	do	Olympia Cotton Guano	Jonesboro	R	6.88	1.44	8.32	---	---	3.92	2.50	---	---	20.20
5229	Crow Fertilizer Co., Monroe, N. C.	Crow's High Grade Blood and Fish Guano.	Monroe	S	6.18	2.07	8.25	.74	2.04	2.78	3.00	---	---	19.20
4989	Farmers Cotton Oil Co., Wilson, N. C.	Golden Gem Guano	Fremont	R	6.15	1.27	7.42	.26	2.64	2.90	3.30	---	---	19.88
5115	Farmers Guano Co., Raleigh, N. C.	Golden Grade Guano	do	R	6.38	.94	7.32	.50	2.62	3.12	2.66	---	---	19.81
5246	Hampton Guano Co., Norfolk, Va.	Hampton Tobacco Guano	Selma	R	5.50	2.29	7.79	1.40	1.60	3.00	3.28	---	---	20.52
4896	do	Princess Prolific Producer	Clinton	R	6.83	1.28	8.11	1.02	2.10	3.12	3.28	---	---	21.20
4829	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Yellow Wrapper Guano.	New Bern	R	4.38	3.72	8.10	1.42	1.44	2.86	2.07	---	---	18.10
4842	Imperial Company, Norfolk, Va.	Imperial Tobacco Guano	Washington	R	5.98	2.13	8.11	1.28	1.70	2.98	2.88	---	---	20.30
4874	do	Imperial X L O Cotton Guano	Herford	R	4.45	3.57	8.02	.58	2.10	2.68	3.24	---	---	19.63
5282	Martin, D. B. Co., Philadelphia, Pa.	Martin's Bull Head Fertilizer	Jonesboro	B	3.08	5.01	8.09	1.64	.94	2.58	3.06	---	---	19.16
4975	Meadows, E. H. & J. A. Co., New Bern, N. C.	for Cotton and Tobacco.	Dover	R	5.70	2.85	8.55	1.18	2.04	3.22	3.18	20.98	.15	21.82
5248	Miller Fertilizer Co., Baltimore, Md.	Meadow's Gold Leaf Tobacco Guano.	Elm City	S	6.30	1.70	8.03	2.00	.84	2.84	3.22	---	---	20.14
4980	do	Standard Phosphate	Elm City	S	5.38	2.89	8.27	2.04	.82	2.86	3.38	3.38	7.50	20.60
4977	Navassa Guano Co., Wilmington, N. C.	Tobacco King	Kinston	S	6.45	1.70	8.15	1.10	2.22	3.32	3.29	3.29	5.70	21.91
4837	do	Clarendon Tobacco Guano	do	S	---	---	---	---	---	---	---	---	---	---
4950	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Navassa High Grade Guano	Washington	R	6.58	2.76	9.34	1.30	1.96	3.26	3.82	---	---	23.34
4923	do	Foy's High Grade Fertilizer	Jacksonville	R	6.40	2.09	8.49	1.44	1.96	3.40	3.18	---	---	22.35
4937	do	Lenoir Bright Leaf Tobacco Grower.	Jacksonville	R	6.60	1.77	8.37	1.06	2.00	3.06	3.85	.99	2.86 .75	21.86
4937	do	Pitts' Prolific Golden Tobacco Guano.	Trenton	R	7.20	1.60	8.80	1.20	1.46	2.66	3.66	1.88	1.78 1.35	20.72

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.																
5065	North Carolina Cotton Oil Co., Wilmington, N. C.	Carter's Lifter	Maxton	R	6.60	2.37	8.97	1.60	1.40	3.00	3.42				\$	21.73
5189	do	Wilmington High Grade	Dunn	R	5.40	3.22	8.62	1.36	1.36	2.72	3.66					20.76
5234	Ober, G. & Sons Co., Baltimore, Md.	Ober's Special Compound for Tobacco.	Youngsville	R	7.78	.76	8.54	1.98	1.02	3.00	3.40	3.40		5.90		21.32
4942	Patapsco Guano Co., Baltimore, Md.	Choctaw Guano	La Grange	S	4.88	3.17	8.05	1.38	1.62	3.00	3.04					20.49
5162	do	Patapsco Tobacco Fertilizer	Bethel	R	6.18	3.34	9.52	1.60	1.44	3.04	2.97					21.87
5157	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Levering's Reliable Tobacco Guano.	Enfield	S	6.38	1.76	8.14	1.36	1.28	2.64	2.96					19.29
5137	do	Piedmont High Grade Ammoniated Bone and Potash.	Dunn	R	6.35	1.62	7.97	.98	1.86	2.84	3.25					20.12
5108	Pocahontas Guano Co., Lynchburg, Va.	Farmer's Favorite Guano, Apex Brand.	Halifax	S	5.95	1.84	7.79	.80	2.00	2.80	3.11					19.67
5035	Pocomoke Guano Co., Norfolk, Va.	Harvey's High Grade Monarch	Edenton	R	6.48	1.61	8.09	1.02	2.04	3.06	3.07					20.75
5222	do	Monarch Tobacco Grower	Four Oaks	R	6.43	1.86	8.29	1.00	2.00	3.00	3.48					21.19
5404	Powhatan Chemical Co., Richmond, Va.	P. C. Co.'s Hustler	Robersonville	S	5.50	2.66	8.16	.66	1.96	2.62	3.04					19.33
4816	Richmond Guano Co., Richmond, Va.	Gilt Edge Fertilizer	Washington	R	7.30	2.31	9.61	1.66	1.60	3.26	3.45					23.20
4826	Royster, F. S., Guano Co., Norfolk, Va.	Bonanza Tobacco Guano	New Bern	R	7.30	1.10	8.40	1.16	1.52	2.68	3.09	3.00		.90		19.80
5335	do	Marlboro High Grade Cotton Grower.	Morven	R	6.58	1.71	8.29	1.10	1.60	2.70	3.02					19.69
5181	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Special Sweet Potato Guano.	Elizabeth City	R	7.18	1.24	8.42	1.52	1.32	2.84	3.10					20.36
5281	Southern Cotton Oil Co., Fayetteville, N. C.	Special Cotton Grower	Jonesboro	R	5.73	2.32	8.05	.38	1.52	2.90	2.88					19.98
5190	Southern Cotton Oil Co., Rocky Mount, N. C.	Edgerton's Old Reliable	Benson	R	6.90	1.36	8.26	1.30	1.58	2.88	3.20					20.52
5064	Southern Exchange Co., Maxton, N. C.	Jack's Best Fertilizer	Maxton	R	6.98	1.49	8.47	1.02	2.10	3.12	3.35					21.60

5116	Tuscarora Fertilizer Co., Baltimore, Md.	Fremont	R	7.03	1.18	8.21	1.48	2.92	3.23	20.58
5106	Union Guano Co., Winston, N. C.	Hobcock	S	6.33	1.04	7.37	1.88	3.04	4.02	21.09
5098	Upshur, R. L., Norfolk, Va.	Edenton	S	7.13	.99	8.12	1.82	2.68	3.03	19.48
4757	Va.-Car. Chemical Co., Richmond, Va.	Faison	S	7.50	1.82	9.32	1.54	3.00	3.97	22.65
5300	Blake's Best Guano	Raleigh	S	6.73	2.44	9.17	2.14	3.00	2.73	21.15
4749	Davie & Whittle's Owl Brand Guano.	Greenville	R	6.58	1.53	8.41	.96	3.08	3.43	21.50
5334	Durham Fertilizer Co.'s Gold Medal.	Scotland Neck	S	7.10	1.39	8.49	1.98	2.66	3.29	20.04
5402	Warsaw	Warsaw	S	7.28	1.85	9.13	.96	2.42	3.02	19.52
5158	Golden Leaf Bright Tobacco Guano.	Whitakers	R	4.85	3.28	8.13	1.30	3.10	2.96	20.80
5359	Isley's Dissolved Bone, Potash and Chemicals.	Burlington	S	5.73	2.50	8.23	2.34	3.32	3.01	21.67
5401	Norfolk and Carolina Chemical Co.'s Amazon High Grade Manure.	Rocky Mount	B	7.30	1.43	8.73	1.62	3.00	4.00	22.16
4841	Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower.	Washington	S	6.80	1.70	8.50	1.36	3.12	3.07	21.32
5027	Old Dominion Farmer's Friend High Grade Fertilizer.	Autryville	B	6.53	1.59	8.12	1.94	.89	2.83	20.61
4792	Old Dominion Farmer's Friend Special Tobacco Fertilizer.	Washington	R	8.90	2.04	8.94	.96	1.96	2.92	20.76
4939	Powers, Gibbs & Co.'s Old Kentucky High Grade Manure.	Gritton	S	5.58	2.14	7.72	1.88	1.42	3.30	21.23
4761	Special High Grade Tobacco Fertilizer.	Center Bluff	R	7.73	2.08	9.81	.40	2.72	3.12	22.58
5118	Special High Grade Tobacco Fertilizer.	Fremont	R	7.23	2.32	9.55	.62	1.92	2.54	20.24
5085	Va. State Fertilizer Co.'s Dunington's Special Formula for Tobacco.	Rocky Mount	S	7.35	1.62	8.97	1.00	2.08	3.08	20.74
5394	Winborne Guano Co., Tyner, N. C.	Edenton	S	6.00	1.92	7.92	-----	2.78	3.37	20.00
5013	Brand claiming N. C.	Wilson	R	5.95	2.34	8.09	1.92	3.00	3.50	20.95
4983	Golden Weed Tobacco Guano	Wilson	R	5.95	2.34	8.09	1.92	2.90	4.12	21.56
5060	Brands claiming American Agricultural Chemical Co., New York City.	Fremont	S	4.13	2.52	8.00	1.42	3.00	4.00	21.50
4926	Ashepoo Fertilizer Co., Charleston, S. C.	Hasty	R	7.28	1.86	9.14	.14	3.12	3.26	23.78
4769	Hubbard Fertilizer Co., Baltimore, Md.	Washington	R	4.83	2.50	7.33	1.60	3.14	4.27	21.65
4769	Piedmont-Mt. Airy Guano Co., Baltimore Md.	Edenton	R	7.50	1.56	8.56	1.28	2.88	3.90	21.50

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ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—(CONTINUED.)

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Sulphate.	Chlorine.		
MIXED FERTILIZERS.																
5029	Southern Exchange Co., Maxton, N. C.	Bull of the Woods Fertilizer	Autryville	S	7.18	1.41	8.59	1.30	1.46	2.76	4.18	---	---	---	---	\$ 21.43
5220	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co., Groom's Special Tobacco Fertilizer.	Benson	R	6.43	2.69	9.12	1.10	2.14	3.24	4.04	4.04	---	---	4.25	23.34
5025	-----do-----	Lion High Grade Tobacco Fertilizer.	Wilson	R	7.34	1.43	8.77	1.25	1.43	2.68	3.44	3.44	---	---	3.75	20.52
5180	Brand claiming Armour Fertilizer Works, Baltimore, Md.	Armour's All Soluble Fertilizer.	Elizabeth City	R	6.08	2.06	8.14	1.64	1.84	3.50	4.00	---	---	---	---	23.15
4924	Mapes Formula and Peruvian Guano Co., New York.	Mapes' Corn Manure	Washington	R	1.40	4.60	6.00	1.90	1.12	3.12	6.40	---	---	---	---	23.48
4876	Brand claiming Camp, W. H., Petersburg, Va.	Camp's Prepared Chemicals—Special Yellow Head.	Edenton	R	5.43	3.26	8.69	3.60	.48	3.50	7.50	---	---	---	---	23.92
4863	Brands claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Fruit and Berry Guano.	Mt. Olive	R	6.33	1.85	8.18	1.86	1.52	3.38	9.73	---	---	---	---	28.10
5031	Navassa Guano Co., Wilmington, N. C.	Navassa Carib Guano	Rocky Mount	R	7.10	1.36	8.46	.86	2.14	3.00	10.28	---	---	---	---	28.82
4982	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Tinsley & Co.'s Tobacco Fertilizer.	Fremont	S	6.65	2.27	8.92	2.56	1.32	4.00	2.50	---	---	---	---	23.15
4793	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Travers & Co. Capital Tobacco Fertilizer.	Washington	R	6.25	1.89	8.14	2.27	2.30	4.00	3.00	---	---	---	---	23.56
5113	Acme Mfg. Co., Wilmington, N. C.	Quick Step Fertilizer	Fremont	R	7.48	1.26	8.74	2.24	1.94	4.00	4.00	---	---	---	---	23.70
5062	Ashepoo Fertilizer Co., Charleston, S. C.	Ashepoo High Grade Guano	John Station	R	7.30	1.50	8.80	1.21	2.72	3.93	4.53	---	---	---	---	24.80
4864	Baugh & Sons Co., Norfolk, Va.	Baugh's Fish, Bone and Potash	Mt. Olive	R	6.90	1.59	8.49	2.07	1.96	4.03	3.99	---	---	---	---	25.88
5385	Columbia Guano Co., Norfolk, Va.	Pelican Guano	Pineville	S	7.83	1.19	9.02	2.25	1.50	3.75	4.27	---	---	---	---	25.33

4869	Miller Fertilizer Co., Baltimore, Md.	Miller's Irish Potato	Elizabeth City	S	5.98	2.51	8.49	2.58	1.26	3.84	4.01	24.72
4854	Navassa Guano Co., Wilmington, N. C.	Coree Tobacco Guano	Warsaw	R	6.90	1.79	8.69	1.66	2.04	3.70	1.85	22.06
5048	do	Navassa Special Truck Guano	Burgaw	R	7.20	1.53	8.73	1.89	2.08	3.97	3.81	25.15
4936	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Truck Grower	Pollocksville	R	6.75	2.07	8.82	2.74	1.80	4.04	4.58	26.30
5336	Read Phosphate Co., Charleston, S. C.	Read's High Grade Cotton Grower	Morven	R	7.60	1.42	9.02	1.07	2.92	3.99	4.83	26.59
5250	Richmond Guano Co., Richmond, Va.	Perfection Special	Concord	R	6.03	2.00	8.03	1.14	2.22	3.36	4.07	22.79
5216	Royster, F. S., Guano Co., Norfolk, Va.	Trucker's Delight	Rae ford	R	7.15	1.07	8.22	2.08	1.72	3.80	4.22	24.58
4859	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Special	Clinton	S	6.03	1.36	8.04	2.31	1.61	3.92	4.15	24.74
Brands claiming												
5250	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture Guano	Elizabeth City	S	7.90	1.53	9.43	2.26	1.80	4.00	5.00	25.90
5380	Va.-Car. Chemical Co., Richmond, Va.	Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano.	Charlotte	S	6.05	2.42	8.43	1.01	3.00	4.01	4.47	25.73
Brands claiming												
5114	Farmers Cotton Oil Co., Wilson, N. C.	Dean's Special Guano	Fremont	R	6.93	.83	7.76	1.34	2.76	4.50	7.00	29.75
5016	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Best Guano	Wilson	S	7.75	.80	8.55	3.66	1.32	4.98	7.02	31.85
Brand claiming												
4751	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Special Plant and Truck Fertilizer.	Edenton	R	7.05	1.72	8.00	2.80	2.34	5.00	3.00	27.00
Brands claiming												
4918	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows Laboss Guano	Newport	R	4.60	3.05	8.00	2.26	2.76	5.00	5.00	29.20
4798	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Virginia Fertilizer Co.'s Virginia Trucker.	Weeksville	R	6.68	1.54	8.22	2.14	2.90	5.04	5.54	30.12
Brands claiming												
4887	Armour Fertilizer Works, Baltimore, Md.	Bone, Blood and Potash Fertilizer.	Washington	R	6.33	1.71	8.04	2.52	2.58	5.00	7.00	31.40
5063	Southern Exchange Co., Maxton, N. C.	McKinnon's Special Truck Formula.	Maxton	R	5.80	2.94	8.74	2.96	2.04	5.00	7.09	32.81
Brand claiming												
4791	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Superphosphate	Washington	R	5.13	2.41	8.50	.72	1.60	2.00	2.00	16.45
Brand claiming												
5268	Pocomoke Guano Co., Norfolk, Va.	Cinco Tobacco Guano	Princeton	S	7.08	1.41	8.50	1.00	1.50	2.50	2.00	18.10
							8.49	1.00	1.50	2.50	2.52	18.66

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ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
MIXED FERTILIZERS.															
Brand claiming		Allison & Addison's Anchor Brand Tobacco Fertilizer.	Whiteville	S	7.74	2.07	8.50	1.40	1.06	2.75	2.00	---	---	---	\$ 18.92
4907	Virginia-Carolina Chemical Co., Richmond, Va.														
Brand claiming		Sea Fowl Guano	Lumberton	R	4.53	4.39	9.00	1.12	1.18	2.25	1.00	---	---	---	18.58
5020	Bradley Fertilizer Co., Boston, Mass.														
Brands claiming		Gold Dust Guano.	Edenton	R	5.93	2.56	9.00	.78	1.34	2.00	2.00	---	---	---	16.90
5130	Holmes & Dawson, Norfolk, Va.														
5232	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special Ammoniated Dissolved Bone.	Franklinton	R	7.38	1.71	9.09	.84	1.20	2.04	2.30	---	---	---	16.92
5305	Peachontas Guano Co., Lynchburg, Va.	Yellow Tobacco Special	Creedmoor	S	8.15	1.10	9.25	.96	.86	1.82	2.01	2.01	6.25	---	17.41
5376	Virginia-Carolina Chemical Co., Richmond, Va.	Durham Fertilizer Company's Standard Guano.	Monroe	S	7.65	1.61	9.26	1.36	.94	2.30	1.24	---	---	---	16.54
Brands claiming		Charlotte High Grade Special Tobacco Fertilizer.	Rocky Mount	R	7.58	2.18	9.00	.68	1.96	2.50	2.00	2.58	2.58	2.35	18.55
5160	Virginia-Carolina Chemical Co., Richmond, Va.														
5361	---do---	Davie & Whittle's Owl Brand Special Tobacco Guano.	Burlington	R	5.95	2.56	8.51	.92	1.86	2.78	2.43	2.43	4.05	---	20.33
Brands claiming		Acme Cotton Grower	La Grange	R	7.83	2.29	9.00	1.08	2.00	2.75	2.00	---	---	---	19.37
4943	Acme Manufacturing Co., Wilmington, N. C.														
5125	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Pacific Tobacco and Cotton Grower.	Williamston	R	6.00	2.12	8.12	.67	2.36	3.03	3.06	3.06	5.50	---	22.18
4895	Columbia Guano Co., Norfolk, Va.	Cotton-seed Meal Special.	Clinton	R	8.08	1.31	9.39	.96	1.76	2.72	2.27	---	---	---	20.67
4882	Imperial Company, Norfolk, Va.	Imperial Martin County Special Crop Grower.	Williamston	R	5.78	2.89	8.67	2.56	1.82	3.88	2.36	---	---	---	19.92
5075	Powhatan Chemical Co., Richmond, Va.	Economic Cotton Grower	Wilson	R	7.03	2.03	9.06	.50	2.14	3.88	2.36	---	---	---	23.20
4923	Roberson, J. H. & Co., Robersonville, N. C.	Roberson's Cotton Grower	Robersonville	R	5.05	4.08	9.13	1.00	1.42	2.64	2.44	---	---	---	19.55
5086	Rocky Mount Guano Co., Rocky Mount, N. C.	Royal Cotton Grower	Rocky Mount	R	5.88	3.87	9.75	.68	2.18	2.42	2.42	---	---	---	19.08
										2.86	2.42	---	---	---	20.87

5202	Richmond Guano Co., Richmond, Va.	Carolina Cotton Grower	Nashville	R	7.38	1.64	9.02	.50	2.50	3.00	2.83	---	21.13
5101	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Meal Mixture	Everetts	R	7.60	.84	8.44	.36	1.92	2.28	3.28	---	18.73
4957	Southern Oil Co., Goldsboro, N.C.	Best & Thompson's Special Cotton Grower.	Goldsboro	R	7.80	2.25	10.05	.72	2.02	2.74	2.26	---	20.57
5317	Union Guano Co., Winston, N. C.	Union Perfect Cotton Grower	High Point	S	6.40	2.66	9.06	1.00	1.35	2.36	1.78	---	17.90
5124	Venable Fertilizer Co., Richmond, Va.	Roanoke Meal Mixture	Everetts	R	8.23	1.42	9.65	.30	2.20	2.50	2.54	---	19.73
5127	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Special Tobacco Manure.	Jamesville	D	8.03	2.26	10.29	.62	1.96	2.58	2.33	2.33	1.80
4790	do	Proline Cotton Grower	Washington	R	8.65	.66	9.31	.46	2.24	2.70	2.61	---	20.15
5403	do	White Stem	Dunn	S	7.45	2.49	9.04	.66	2.34	3.00	2.05	2.05	2.05
5444	Brands claiming American Agricultural Chemical Co., New York.	Zell's Victoria Animal Bone Compound.	Creedmoor	R	6.20	2.59	8.79	.60	1.74	2.34	4.03	---	20.06
5152	Berkley Chemical Co., Norfolk, Va.	Monitor Animal Bone Fertilizer.	Wadesboro	R	6.45	2.00	8.45	.84	1.88	2.72	3.68	---	20.63
4985	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Sun Brand Guano.	Fremont	S	7.38	2.27	9.65	1.22	1.34	2.56	4.69	---	21.85
5299	Brands claiming Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s L. and M. Special	Raleigh	R	6.88	2.55	9.43	1.52	1.64	3.00	2.00	---	20.20
5091	do	Powers, Gibbs & Co.'s Standard Guano.	Roseboro	R	7.58	1.64	9.22	.74	1.98	2.72	2.18	---	19.67
5301	Brand claiming Richmond Guano Co., Richmond, Va.	Hunter & Dunn's Ammoniated Fertilizer.	Raleigh	S	3.95	4.23	9.00	.42	2.60	3.00	2.25	---	20.47
5210	Brands claiming Pocahontas Guano Co., Lynchburg, Va.	Pocahontas Special Tobacco Fertilizer.	Spring Hope	R	6.48	2.51	8.99	.74	2.16	2.90	3.15	3.45	21.30
4803	Brands claiming American Fertilizing Co., Norfolk, Va.	Pitt County Special Fertilizer	Greenville	R	7.04	3.68	9.00	1.84	1.94	3.50	5.00	---	25.15
4946	do	Special Formula Guano for Yellow Leaf Tobacco.	La Grange	R	8.13	1.46	9.59	.20	3.18	3.38	4.87	4.87	25.14
5205	Richmond Guano Co., Richmond, Va.	Saunders' Special Formula for Bright Tobacco.	Spring Hope	R	6.28	2.62	8.90	.50	2.70	3.20	5.36	1.06	4.30
5086	Brand claiming Patapsco Guano Co., Baltimore, Md.	Patapsco Guano	Avoca	R	7.33	1.87	9.25	.58	2.06	2.50	2.00	---	18.78
5236	Brand claiming Patapsco Guano Co., Baltimore, Md.	Patapsco Guano for Tobacco	Youngsville	S	6.58	2.30	9.25	.78	1.56	2.25	2.00	---	17.95
							8.88			2.34	2.24	2.24	3.95

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; Y—lumpy; W—wet.

4870	Imperial Company, Norfolk, Va.	Imperial 5-6-7 Potato Guano	Elizabeth City	S	3.75	2.29	6.04	2.20	2.33	4.53	6.53	27.57
4930	Miller Fertilizer Co., Baltimore, Md.	High Grade Potato	Harbinger	S	4.30	2.34	6.64	2.69	1.84	4.53	7.58	29.26
4776	Va.-Car. Chemical Co., Richmond, Va.	V.-C. Invincible High Grade Fertilizer for Truck.	Elizabeth City	R	6.38	.63	7.01	2.94	2.98	5.92	6.88	33.41
4940	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	James G. Tinsley & Co.'s Irish Potato Guano.	Grifton	R	4.15	2.16	6.31	4.37	1.92	6.00	6.00	31.80
4745	Brands claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Cabbage Guano	Elizabeth City	R	4.98	1.04	6.02	4.12	3.10	7.00	5.00	34.00
4762	do	Baugh's 7 Per Cent Potato Guano.	Aurora	R	5.20	1.09	6.29	3.74	3.14	6.88	5.31	35.10
5104	do	do	Robersonville	S	5.90	.85	6.75	4.08	3.00	7.08	5.38	35.35
4911	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Truckers 7 Per Cent Royal Seal Compound.	New Bern	S	4.33	1.44	5.77	5.82	1.32	7.14	5.23	34.50
5040	Harrell, S. B. & Co., Norfolk, Va.	Harrell's Truck Guano	Edenton	R	7.40	2.24	5.64	2.77	3.54	6.31	5.52	31.97
4929	Pocomoke Guano Co., Norfolk, Va.	Seaboard Popular Truck	Powell's Point	R	2.93	3.06	5.99	3.11	2.40	6.51	5.43	32.84
4928	Upshur, R. L., Norfolk, Va.	Upshur's 7 Per Cent Irish Potato Guano.	Newbern's Landing.	S	2.45	3.13	5.58	3.66	3.20	6.86	5.00	33.28
4931	Brand claiming Upshur, R. L., Norfolk, Va.	Upshur's Farmers Challenge Guano.	Jarvisburg	S	4.05	2.24	6.29	3.16	2.16	7.00	6.00	35.10
5050	Brand claiming Acme Manufacturing Co., Wilmington, N. C.	Acme Truck Grower	Faison	R	5.68	1.49	7.17	2.31	1.70	4.00	8.00	27.40
5393	Brand claiming Imperial Company, Norfolk, Va.	Imperial Roanoke Crop Grower	Edenton	S	6.45	1.50	7.95	1.58	1.42	3.00	2.00	18.40
5021	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Formula 44 for Bright Wrappers.	Wilson	S	5.63	1.61	7.24	.90	2.30	3.10	3.20	19.27
4994	Brand claiming Baltimore Fertilizer Co., Baltimore, Md.	Honest Revenue	Elizabeth City	S	4.60	2.47	7.07	.64	2.30	3.20	3.21	20.60
5182	Brands claiming Berkley Chemical Co., Norfolk, Va.	Victor Special Crop Grower	Elizabeth City	R	5.40	1.72	7.12	1.70	2.12	4.00	4.00	23.90
4986	Hampton Guano Co., Norfolk, Va.	Little's Favorite Crop Grower	Fremont	R	5.45	1.70	7.15	1.62	2.40	3.82	4.20	23.63
4811	Brands claiming American Fertilizer Co., Norfolk, Va.	American Irish Potato Grower	Edenton	R	4.65	2.61	7.26	2.65	3.36	4.02	4.24	24.36
4799	do	Standard 7 Per Cent Ammonia.	Greenville	R	5.12	1.68	6.80	4.54	2.70	5.00	5.00	28.30
4784	American Agricultural Chemical Co., New York.	Lazaretto Early Truck	Washington	S	3.23	3.34	6.57	2.92	3.18	6.01	4.22	31.01
5120	do	Zell's Truck Guano	Fremont	R	4.30	2.55	6.85	2.02	2.72	7.24	5.38	35.93
										4.74	5.08	31.82
												27.39

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ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.	
			Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.															
4913	Cowell, Swan & McCotter Co., Bayboro, N. C.	Cowell, Swan & McCotter Co.'s Beaufort High Grade Truck Guano.	R	5.00	2.47	7.47	2.08	2.06	4.14	6.13					\$ 27.12
4932	Hampton Guano Co., Norfolk, Va.	Reliance Truck Guano.	R	4.48	2.32	6.80	2.12	2.80	4.92	5.00					27.85
5247	Patapasco Guano Co., Baltimore, Md.	Patapasco Truck for Early Rocky Mount Vegetables.	R	4.38	2.40	6.78	1.74	2.82	4.56	4.86					26.50
4813	PocomokeGuano Co., Norfolk, Va.	Standard Truck Guano.	S	4.70	2.37	7.07	2.78	2.34	5.12	5.00					28.76
4992	Royster, F. S., Guano Co., Norfolk, Va.	Royal Potato Guano.	R	5.70	1.35	7.05	2.43	2.22	4.65	5.50					27.77
Brands claiming															
4889	Navassa Guano Co., Wilmington, N. C.	Navassa Root Crop Fertilizer.	R	5.80	1.60	7.40	2.42	2.58	5.00	7.00					30.50
4915	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Ives' Irish Potato Guano.	R	5.38	2.29	7.67	2.60	2.42	5.02	7.12					32.28
4995	Royster, F. S., Guano Co., Norfolk, Va.	Nor-Royster's Early Truck Guano.	R	5.58	1.29	6.87	2.66	2.02	4.68	8.78					30.50
Brands claiming															
4787	Fragaw, Wm. & Co., Washington, N. C.	Pamlico Truck.	R	4.85	2.30	7.15	1.54	3.48	5.02	7.98					31.58
5405	Imperial Co., Norfolk, Va.	Imperial High Grade Irish Potato Guano.	R	5.73	1.68	7.41	2.39	2.30	4.69	7.04					31.60
4919	Meadows, E. H. & J. A. Co., Bern, N. C.	New Meadows' Great Potato Guano.	R	4.60	2.54	7.14	2.02	2.80	4.82	8.29					31.45
Brands claiming															
4815	Richmond Guano Co., Richmond, Va.	Special High Grade for Truck.	R	6.55	1.35	7.90	4.38	2.36	6.74	5.52					29.88
Brands claiming															
4840	Imperial Company, Norfolk, Va.	Imperial 7-7-7 Potato Guano.	R	4.45	2.49	7.00	4.43	1.64	7.00	7.00					31.60
4917	Meadows, E. H. & J. A. Co., Bern, N. C.	Great Cabbage Guano.	S	5.15	1.55	6.70	4.39	2.12	6.51	7.40					35.42
Brands claiming															
5334	Read Phosphate Co., Charleston, S. C.	Read's Red Diamond Special Fertilizer.	S	7.66	2.14	10.00	.92	1.48	3.00	3.13					37.10
						9.72			2.40						34.66
															35.65
															22.20
															20.11

5366	Brand claiming Va.-Car. Chemical Co., Rich- mond, Va.	Charlotte Oil and Fertilizer Co.'s Oliver's Perfect Wheat Grower.	Charlotte	R	7.20	4.85	11.00 12.05	1.46	1.42	3.00 2.88	4.00 4.26	24.20 25.03
5293	Brand claiming Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Soluble Bone and Potash.	High Point	R	4.08	2.90	8.00 6.98				2.00 2.45	9.40 8.97
5397	Brands claiming Navassa Guano Co., Wilmington, N. C.	Warlick's Mixture	Greensboro	R	4.00	4.54	8.00 8.54				2.25 1.90	9.67 9.77
5319	Union Guano Co., Winston, N. C.	Sunrise Soluble Bone and Potash.	High Point	R	4.30	4.17	8.47				3.21	11.15
5369	Va.-Car. Chemical Co., Rich- mond, Va.	A. & A.'s McCavock Special Potash Mixture.	Wilkesboro	R	3.95	4.25	8.18				2.02	9.58
5370	Brands claiming Union Guano Co., Winston, N. C.	V.-C. Co.'s Solid South	Wilkesboro	R	4.90	4.72	9.62 8.00				1.20 4.00	9.98 11.60
5320	Union Guano Co., Winston, N. C.	Union Wheat Mixture	High Point	R	4.30	4.02	8.32				3.74	11.60
5292	Va.-Car. Chemical Co., Rich- mond, Va.	Miller's Special Wheat Mix- ture.	High Point	R	5.30	3.58	8.88				4.12	12.52
5274	Brands claiming Union Guano Co., Winston, N. C.	Rockingham Bone and Potash	Lexington	R	5.25	3.81	8.50				2.00	9.85
4952	Va.-Car. Chemical Co., Rich- mond, Va.	Old Dominion Guano Co.'s Dissolved Bone.	Seven Springs	R	5.25	4.15	9.40				2.30 2.43	16.68 11.13
5103	Brands claiming American Fertilizer Co., Nor- folk, Va.	Dissolved Bone and Potash for Corn and Wheat.	Elizabeth City	R	7.53	4.94	12.47				2.00	11.20
5185	Armour Fertilizer Works, Balti- more, Md.	No. 1.	Elizabeth City	R	7.88	2.37	10.25				2.13	11.56
4849	Baugh & Sons Co., Norfolk, Va.	Baugh's Soluble Alkaline Su- perphosphate.	Elizabeth City	R	1.43	9.07	10.50				2.23	11.90
5356	Berkley Chemical Co., Norfolk, Va.	Laurel Potash Mixture	Richlands	R	7.25	3.35	10.60				2.00	11.74
5111	Caraleigh Phosphate and Fertil- izer Works, Raleigh, N. C.	Bone and Potash Mixture	Oak City	R	5.78	5.67	11.45				1.53	11.99
5184	Columbia Guano Co., Norfolk, Va.	Columbia Bone and Potash Mixture.	Edenton	R	8.23	1.87	10.10				1.93	11.21
4920	Hubbard Fertilizer Co., Balti- more, Md.	Hubbard's Soluble Bone and Potash.	New Bern	R	5.95	5.09	11.04				1.88	12.00
4927	Imperial Co., Norfolk, Va.	Imperial Bone and Potash	Washington	R	4.78	5.52	10.30				2.12	11.60
5093	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone and Potash.	Autryville	R	8.53	3.26	11.79				2.00	12.81
4653	New Bern Cotton Oil and Fer- tilizer Mills, New Bern, N. C.	Carteret Bone and Potash	Richlands	R	8.03	1.96	9.99				2.65	11.90
5138	Powhatan Chemical Co., Rich- mond, Va.	Bone and Potash Mixture	Dunn	R	5.23	4.81	10.04				1.89	11.11
5363	Richmond Guano Co., Richmond, Va.	do	Burlington	R	5.50	4.70	10.20				2.02	11.40

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ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—(CONTINUED.)

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.		
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.			
MIXED FERTILIZERS.																	
5094	Royster, F. S., Guano Co., Norfolk, Va.	Bone and Potash Mixture.	Roseboro	R	9.10	2.72	11.82										\$ 12.69
5197	Southern Exchange Co., Maxton, N. C.	do	Dunn	R	6.20	3.95	10.15										11.24
5227	Swift Fertilizer Works, Atlanta, Ga.	Standard High Grade Field and Farm.	Wilkesboro	R	5.83	5.09	10.92										12.05
4603	Va-Car, Chemical Co., Richmond, Va.	Potash Compound.	Pilot Mountain	R	4.35	5.56	9.91										10.87
5273	do	Blue Ridge Wheat Grower	Salisbury	R	6.63	4.49	11.12										12.48
5269	do	Durham Fertilizer Co.'s Bone and Potash Mixture.	Selma	R	7.50	2.76	10.26										11.21
4584	do	Lynchburg Guano Co.'s Dissolved Bone and Potash.	Elkin	R	5.53	4.32	9.85										10.93
5196	do	Old Dominion Guano Co.'s High Grade Alkaline Bone and Potash.	Dunn	R	7.33	3.96	11.29										11.73
4960	do	Powers, Gibbs & Co., Dissolved Bone and Potash.	Goldsboro	R	8.83	2.91	11.74										11.99
5253	do	Southern Chemical Co.'s Mammoth Corn Grower.	Salisbury	R	7.33	2.42	9.75										11.24
4585	do	Southern Chemical Co.'s Mammoth Wheat and Grass Grower.	Elkin	R	5.98	3.67	9.65										10.85
5390	do	Southern Chemical Co.'s Winston Bone and Potash Compound.	Hiddenite	R	4.60	5.46	10.06										10.91
4655	do	Southern Chemical Co.'s Winston Bone and Potash Compound.	Kernersville	R	5.18	4.81	9.99										10.94
4645	do	Tinsley & Co.'s Bone and Potash Mixture.	Rural Hall	R	5.38	4.76	10.14										11.05
5288	do	Tinsley & Co.'s Capital Bone and Potash.	do	R	5.63	4.49	10.12										11.22

5347	---do---	Travers & Co.'s Capital Bone Spring Hope and Potash Compound.	R	6.35	3.46	9.81	---	---	2.19	---	11.24
Brand claiming											
5326	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Morris & Scarboro's Special Bone and Potash Mixture for Wheat.	R	6.65	4.67	10.00	---	---	3.00	---	12.30
						11.32	---	---	2.51	---	12.95
Brands claiming											
5056	American Fertilizer Co., Norfolk, Va.	Double Dissolved Bone and Potash.	R	7.65	3.56	11.21	---	---	4.00	---	13.40
4877	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Potash Mixture.	R	4.05	7.95	12.00	---	---	3.72	---	14.18
						---	---	---	3.73	---	14.90
5261	Patapsco Guano Co., Baltimore, Md.	Patapsco 10-4 Potash Mixture. Edenton	S	7.25	2.48	9.73	---	---	3.71	---	12.83
5195	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Bone and Potash Mixture.	S	6.28	3.76	10.04	---	---	3.63	---	13.03
5386	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	S	6.63	3.39	10.02	---	---	3.52	---	12.89
5328	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s S. N. Special Bone and Potash Mixture.	R	7.35	2.90	10.25	---	---	3.42	---	12.99
5371	---do---	Southern Chemical Co.'s Winter Grain Mixture.	R	6.60	3.59	10.19	---	---	3.62	---	13.15
5309	---do---	V.-C. Co.'s Special Potash Mixture.	R	7.63	3.54	11.17	---	---	3.74	---	14.16
Brands claiming											
5364	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Special Potash Mixture.	R	7.70	2.30	10.00	---	---	5.00	---	14.50
5199	Va.-Car. Chemical Co., Richmond, Va.	Virginia State Mountain Top Bone and Potash.	R	6.88	3.76	10.64	---	---	4.07	---	13.48
Brands claiming											
5042	Berkley Chemical Co., Norfolk, Va.	Berkley Bone and Potash Mixture.	R	7.28	3.24	11.00	---	---	2.00	---	12.10
						10.52	---	---	2.21	---	11.99
5133	Hampton Guano Co., Norfolk, Va.	Hampton Bone and Potash.	R	8.35	2.36	10.72	---	---	1.85	---	11.67
5224	Patapsco Guano Co., Baltimore, Md.	Baltimore Soluble Phosphate	R	6.50	3.96	10.46	---	---	2.07	---	11.68
5038	Pocomoke Guano Co., Norfolk, Va.	Alkali Bone	R	8.40	2.77	11.17	---	---	2.05	---	12.30
5095	Va.-Car. Chemical Co., Richmond, Va.	A. & A. B. P. Potash Mixture	R	9.23	2.62	11.85	---	---	1.49	---	12.30
Brands claiming											
5217	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Horne & Sons High Grade Bone and Potash.	D	7.20	3.31	11.00	---	---	5.00	---	15.40
5198	Patapsco Guano Co., Baltimore, Md.	Patapsco High Grade Bone and Potash.	R	8.03	2.54	10.51	---	---	4.25	---	14.13
						10.57	---	---	4.47	---	14.43
Brand claiming											
5218	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Special Bone and Potash	R	7.23	4.27	12.00	---	---	2.00	---	13.00
						11.50	---	---	2.00	---	12.55
Brand claiming											
5251	Union Guano Co., Winston, N. C.	Union 12-3 Bone and Potash	R	8.53	4.32	12.00	---	---	3.00	---	14.10
						12.85	---	---	2.84	---	14.69

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5395	Richmond Guano Co., Richmond, Va.	Dissolved S. C. Phosphate.	Hertford	R	6.33	5.41	11.74		9.39
5321	Swift Fertilizer Works, Atlanta, Ga.	Swift's Chatahoochee Standard Grade Acid Phosphate	Ashboro,	S	7.50	4.52	12.02		9.62
5373	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s Standard Acid Phosphate.	Wilkesboro	S	5.85	5.51	11.36		9.09
4778	do	Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate.	Edenton	R	10.00	2.90	12.90		10.32
Brands claiming									
5097	Acme Manufacturing Co., Wilmington, N. C.	Acme Acid Phosphate	Stendman	R	11.38	3.07	13.00		10.40
5057	American Fertilizer Co., Norfolk, Va.	Eagle High Grade Acid Phosphate.	Ashpole	R	11.45	2.88	14.33		11.56
5054	Armour Fertilizer Works, Wilmington, N. C.	Armour's 13 Per Cent Acid Phosphate.	Mt. Olive	S	14.48	1.75	16.23		11.46
5169	Ashepool Fertilizer Co., Charles- ton, S. C.	Ashepool X X Acid Phosphate.	Charlotte	R	12.08	1.92	14.70		12.98
5278	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Sterling High Grade Acid Phosphate.	Lexington	R	9.85	3.68	13.53		11.76
5323	Columbia Guano Co., Norfolk, Va.	Columbia High Grade Dissolved Bone.	Wadesboro	R	8.83	5.79	14.62		10.82
5275	Elwan Fertilizer Co., Charleston, S. C.	Diamond Soluble Bone	Salisbury	R	10.30	2.85	13.15		11.70
5277	Farmers' Guano Co., Raleigh, N. C.	Farmer's High Grade Acid Phosphate.	Lexington	R	8.45	4.67	13.12		10.52
4867	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Dissolved Bone.	Mt. Olive	R	10.93	3.27	14.20		10.50
5329	Richmond Guano Co., Richmond, Va.	Premium Dissolved Bone	Wilkesboro	R	6.70	5.59	12.29		11.36
5018	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade Dissolved Bone.	Wilson	R	10.75	2.43	13.18		9.83
5331	Swift Fertilizer Works, Atlanta, Ga.	Swift's Harrow High Grade Acid Phosphate.	Wilkesboro	R	6.75	.69	12.44		10.54
5171	Union Guano Co., Winston, N. C.	Union Dissolved Bone	Charlotte	D	9.55	3.39	12.94		9.95
5375	Va.-Car. Chemical Co., Richmond, Va.	Chatham Acid Phosphate	Elkin	R	9.80	3.19	12.99		10.35
4851	do	Greshaw's Acid Phosphate	Plymouth	R	9.70	3.47	13.17		10.54
5254	do	Durham Fertilizer Co.'s Double Bone Phosphate—Ex. Strong	Concord	R	8.05	6.13	14.18		11.34
5139	do	Norfolk and Carolina Chemical Co.'s Best Acid Phosphate.	Fayetteville	R	10.93	2.71	13.64		10.91
5297	do	Old Dominion High Grade Bone Phosphate.	High Point	R	6.25	6.22	12.47		9.98
4962	do	Powers, Gibbs & Co.'s Cotton Brand High Grade Acid Phosphate.	Goldsboro	R	11.00	2.60	13.60		10.88
4954	do	Tinsley & Co.'s Dissolved S. C. Bone.	Seven Springs	R	10.43	4.13	14.56		11.65

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
RAW OR UNMIXED FERTILIZER MATERIALS.																
5314	Va.-Car. Chemical Co., Richmond, Va.	Travers & Co.'s Standard Dissolved Bone.	Selma	R	8.63	3.41	12.04									\$ 9.63
5343	do	Victor High Grade Acid Phosphate.	Mebane	R	7.53	4.76	12.29									9.83
5270	Brands claiming Acme Manufacturing Co., Wilmington, N. C.	Acme High Grade Acid Phosphate.	Princeton	R	12.78	2.04	14.00									11.20
5339	American Agricultural Chemical Co., New York.	Detrick's XXtra Acid Phosphate.	Tunis	R	10.63	3.37	14.00									11.85
5310	do	Lazaretto Acid Phosphate	Kelford	R	11.35	3.22	14.57									11.65
4777	American Agricultural Chemical Co., New York City.	Lazaretto Dissolved Bone Phosphate.	Williamston	R	11.63	2.91	14.54									11.63
4755	American Fertilizer Co., Norfolk, Va.	High Grade Acid Phosphate	Elizabeth City	R	12.10	1.90	14.00									11.20
5045	Armour Fertilizer Works, Baltimore, Md.	Armour's Star Phosphate Fertilizer.	Old Trap	R	9.58	4.41	13.99									11.19
5043	Arps, Geo. L., & Co., Norfolk, Va.	14 Per Cent Acid Phosphate	Edenton	R	8.65	6.06	14.71									11.77
5067	Ashpoo Fertilizer Co., Charleston, S. C.	XXXX Acid Phosphate.	John Station	R	11.43	3.50	14.93									11.94
5295	Atlantic Chemical Co., Norfolk, Va.	Atlantic 14 Per Cent Acid Phosphate.	Lexington	R	13.65	1.92	15.57									12.45
5186	Baltimore Fertilizer Co., Baltimore, Md.	Honest Acid Phosphate	South Mills	R	11.18	3.27	14.45									11.56
4879	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Acid Phosphate.	Edenton	D	9.08	5.27	14.35									11.48
5322	Berkley Chemical Co., Norfolk, Va.	Berkley Acid Phosphate	Wadesboro	R	11.29	3.41	14.61									11.68
5166	Burton, C. J., Guano Co., Baltimore, Md.	Acid Phosphate	Enfield	R	10.23	3.96	14.19									11.35
5082	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Climax Dissolved Bone	Wake Forest	R	8.25	4.12	12.37									9.90
4843	Columbia Guano Co., Norfolk, Va.	Columbia High Grade 14 Per Cent Acid Phosphate.	Creswell	R	12.35	1.94	14.29									11.43

5231	Crow Fertilizer Co., Monroe, N. C.	Crow's Acid Phosphate	Monroe	R	11.95	3.20	15.15	12.12
5262	Eureka Fertilizer Co., Perryville, Md.	P. & F. Superphosphate	Elizabeth City	R	1.50	10.54	12.04	9.63
4963	Farmer, W. S., & Co., Baltimore, Md.	Dissolved S. C. Bone	Goldsboro	R	9.70	3.95	13.68	10.92
5078	Farmers Cotton Oil Co., Wilson, N. C.	Bonum Acid Phosphate	Black Creek	R	11.23	2.86	14.09	11.27
4999	Hampton Guano Co., Norfolk, Va.	Hampton Acid Phosphate	Edenton	R	11.33	3.31	14.64	11.71
5044	Harrell, S. B., & Co., Norfolk, Va.	Harrell's Acid Phosphate	do	R	11.23	2.99	14.22	11.37
4921	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's High Grade Soluble Tennessee Phosphate	New Bern	R	12.48	2.31	14.79	11.83
4878	Imperial Company, Norfolk, Va.	Imperial High Grade Acid Phosphate	Edenton	D	11.98	2.52	14.50	11.60
5238	Miller Fertilizer Co., Baltimore, Md.	Acid Phosphate	Kelford	D	12.05	2.40	14.45	11.56
5358	Meadows, E. H. & J. A. Co., New Bern, N. C.	New Meadows' Diamond Acid Phosphate	Kinston	R	10.85	4.02	14.87	11.90
4891	Navassa Guano Co., Wilmington, N. C.	Navassa 14 Per Cent Acid Phosphate	Edenton	R	7.33	6.66	13.99	11.19
4754	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	14 Per Cent Acid Phosphate	do	R	10.45	3.27	13.72	10.98
5134	Norfolk Fertilizing Co., Norfolk, Va.	High Grade Acid Phosphate	do	D	11.70	2.64	14.34	11.47
5230	Patapsco Guano Co., Baltimore, Md.	Patapsco Pure Dissolved Bone	Monroe	R	11.23	2.97	14.20	11.35
4818	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	High Grade Acid Phosphate	Edenton	R	12.15	1.75	13.90	11.12
4819	do	Piedmont High Grade S. C. Bone	do	R	12.25	1.76	14.01	11.21
4796	Pocomoke Guano Co., Norfolk, Va.	Pearless Acid Phosphate	Washington	R	9.10	4.29	13.39	10.71
4852	Rasin-Monumental Co., Baltimore, Md.	Rasin's Acid Phosphate	Edenton	R	11.70	3.17	14.87	11.90
5155	Richmond Guano Co., Richmond, Va.	High Grade Acid Phosphate	Rockingham	D	10.35	3.61	13.96	11.16
4830	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate	New Bern	D	10.83	3.61	14.41	11.55
5140	Southern Cotton Oil Co., Goldsboro, N. C.	High Grade Acid Phosphate	Fayetteville	R	10.53	2.89	13.42	10.74
5135	Upshur, R. L., Norfolk, Va.	Upshur's High Grade Acid Phosphate	Hertford	D	11.83	2.46	14.29	11.43
4860	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Fulton Acid Phosphate	Falson	R	10.55	3.69	14.24	11.39
5017	do	Atlantic and Virginia Fertilizer Co.'s Valley of Virginia Bone Phosphate	Goldsboro	R	12.48	1.84	14.32	11.46
5172	do	Davie & Whittle's Owl Brand Dissolved Bone	Charlotte	R	9.25	4.74	14.02	11.21

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

5315	Imperial Company, Norfolk, Va.	Imperial High Grade Tennessee see Acid Phosphate.	Lucama	R	15.10	1-92	17.02	13.62
5141	Navassa Guano Co., Wilmington, N. C.	Navassa 16 Per Cent Acid Phosphate.	Fayetteville	R	12.35	3.61	15.96	12.77
5387	Pocomoke Guano Co., Norfolk, Va.	Superb Acid Phosphate	Charlotte	R	10.28	5.89	16.17	12.94
5145	Rasin-Monumental Co., Baltimore, Md.	Rasin's Acid Phosphate	Franklin	R	14.35	2.02	16.37	13.10
5213	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone Phosphate	Spring Hope	R	11.65	4.04	15.69	12.55
5009	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade 16 Per Cent Acid.	Lumberton	R	13.98	2.36	16.34	13.07
5034	Southern Exchange Co., Maxton, N. C.	S. E. C. Acid Phosphate	Aurville	R	13.20	3.21	16.41	13.13
5144	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Comet Acid Phosphate.	Franklin	R	13.05	3.21	16.26	13.01
5354	Union Guano Co., Winston, N. C.	Virginia State Fertilizer Co.'s Bull Run Acid Phosphate.	Clayton	S	12.13	5.42	17.55	14.04
5306	Brands claiming	Union 16 Per Cent Acid Phosphate.	Kittrell	R	12.68	3.47	16.15	12.92
5123	Acme Fertilizer Co., Wilmington, N. C.	Pure German Kainit	Fremont	S			12.00 12.40	12.00 12.40
4781	American Agricultural Chemical Co., New York City.	Genuine German Kainit	Edenton	R			12.04	12.04
4756	American Fertilizer Co., Norfolk, Va.	do	Elizabeth City	S			12.60	12.60
4893	Armour Fertilizer Works, Baltimore, Md.	do	Washington	R			12.70	12.70
5254	Arps, Geo. L., & Co., Norfolk, Va.	Kainit	Edenton	S			12.76	12.76
5396	Atlantic Chemical Co., Norfolk, Va.	German Kainit	do	S			11.26	11.26
4808	Baugh & Sons Co., Norfolk, Va.	Genuine German Kainit	do	S			13.04	13.04
4964	Best & Thompson, Goldsboro, N. C.	do	Goldsboro	S			12.06	12.06
5107	Burton, C. J., Guano Co., Baltimore, Md.	do	Enfield	S			12.53	12.53
4908	Calder Bros., Wilmington, N. C.	do	Whiteville	R			12.16	12.16
5149	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	do	Franklin	R			12.76	12.76
4853	Columbia Guano Co., Norfolk, Va.	do	Edenton	S			11.77	11.77
4338	Crow Bros., Monroe, N. C.	do	Monroe	S			12.70	12.70
4965	Farmer, W. S., & Co., Baltimore, Md.	do	Goldsboro	S			10.62	10.62
4892	Hampton Guano Co., Norfolk, Va.	do	Edenton	R			11.55	11.55
5150	Imperial Company, Norfolk, Va.	do	Franklin	S			11.80	11.80
5001	Miller Fertilizer Co., Baltimore, Md.	do	Edenton	S			12.00	12.00
5239	Navassa Guano Co., Wilmington, N. C.	do	Kelford	S			12.24	12.24
4868	do	do	Mount Olive	S			12.08	12.08

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash	Potash from Muriate.	Potash from Sulphate.		Chlorine.
RAW OR UNMIXED FERTILIZER MATERIALS.															
4955	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Genuine German Kainit	Richlands	S									13.12		13.12
5187	Norfolk Fertilizing Co., Norfolk, Va.	do	Edenton	S									12.68		12.68
4991	Patapasco Guano Co., Baltimore, Md.	do	Fremont	S									10.70		10.70
4821	Piedmont-Mount Airy Guano Co., Baltimore, Md.	do	Edenton	R									12.32		12.32
5388	Pocomoke Guano Co., Norfolk, Va.	do	Charlotte	S									11.48		11.48
4768	Pocomoke Guano Co., Norfolk, Va.	do	Edenton	B									11.56		11.56
5244	Powhatan Chemical Co., Richmond, Va.	do	Henderson	S									12.51		12.51
4917	Richmond Guano Co., Richmond, Va.	do	Grifton	S									12.48		12.48
5087	Southern Cotton Oil Co., Goldsboro, N. C.	do	Rocky Mount	B									10.65		10.65
5279	Union Guano Co., Winston, N. C.	do	Waxhaw	S									12.00		12.00
4820	Upshur, R. L., Norfolk, Va.	do	Elizabeth City	S									13.14		13.14
4894	Va.-Car. Chemical Co., Richmond, Va.	do	Edenton	S									12.58		12.58
4780	Winborne Guano Co., Tyner, N. C.	do	Tyner	R									11.78		11.78
Brand claiming		do	do										48.00		48.00
5058	Acme Manufacturing Co., Wilmington, N. C.	Muriate of Potash	Chadbourn	S									51.15		51.15
Brands claiming		do	do										50.00		50.00
5215	Baugh & Sons Co., Norfolk, Va.	Sulphate of Potash	Spring Hope	D									48.35		48.35
4973	Va.-Car. Chemical Co., Richmond, Va.	Sulphate of Potash	Fair Bluff	N									49.62		49.62
4974	do	Muriate of Potash	do	R									46.60		46.60
Brand claiming		do	do										2.00		2.00
4807	Lee, A. S. & Sons, Richmond, Va.	Lee's Prepared Agricultural Lime.	Edenton	R									2.28		2.28

Brand claiming	Baugh & Sons Co., Norfolk, Va.	Baugh's Tankage	Elizabeth City	R				9.00		26.10
Brand claiming	Va.-Car. Chemical Co., Richmond, Va.	Ground Fish	Plymouth	B				9.00		26.10
5000								10.00		29.00
								11.26		32.65
Brands claiming	Hardison Co., Wadesboro, N. C.	Nitrate of Soda	Wadesboro	B				18.00		52.20
5154	Smith, Oliver & Co., Wilmington, N. C.	Nitrate of Soda	Mount Olive	B				18.88		54.75
4903								18.86		54.69
Brands claiming	Acme Manufacturing Co., Wilmington, N. C.	Nitrate of Soda	Chadbourn	B				19.00		55.10
5059								18.82		54.52
5324	American Fertilizer Co., Norfolk, Va.	Nitrate of Soda	Wadesboro	B				18.76		54.40
5068	Baugh & Sons Co., Norfolk, Va.	Nitrate of Soda	John Station	B				19.15		55.53
5147	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	do	Franklin	S				18.83		54.61
5148	Hampton Guano Co., Norfolk, Va.	do	do	S				19.11		55.42
5378	Navassa Guano Co., Wilmington, N. C.	do	Monroe	B				18.96		54.98
5153	Richmond Guano Co., Richmond, Va.	do	Rockingham	B				18.68		54.17
5389	Royster, F. S., Guano Co., Norfolk, Va.	do	Concord	B				18.72		54.29
5279	Union Guano Co., Winston, N. C.	do	Lexington	B				18.76		54.40
5214	Va.-Car. Chemical Co., Richmond, Va.	do	Spring Hope	B				18.72		54.29
Brand claiming	Martin, B. D., Co., Philadelphia, Pa.	Pure Ground Bone	Greensboro	N				2.00		
5398								2.17		22.60
Brand claiming	Baugh & Sons Co., Norfolk, Va.	Baugh's Raw Bone Meal	High Point	D				4.50		
5294								4.66		27.81
Brands claiming	Mortimer, E., & Co., New York	Genuine Imported Guano.	Lumberton	R				3.60	4.25	
5019								3.52	3.85	
4956	do	do	Goldsboro	R				3.38	3.17	
5237	do	do	Monroe	R				3.38	3.56	
5053	do	do	Mt. Olive	R				3.34	4.31	
Brands claiming	Mortimer, E., & Co., New York	Genuine Imported Guano.	Jacksonville	R				3.80	4.25	
4935								3.64	4.11	

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

a Total Phosphoric Acid found 23.30, valued at 3½ cents per pound.

b Total Phosphoric Acid found 20.43, valued at 3½ cents per pound.

c Total Phosphoric Acid found 23.10, valued at 3½ cents per pound.

d Total Phosphoric Acid found 22.40, valued at 3½ cents per pound.

e Total Phosphoric Acid found 22.63, valued at 3½ cents per pound.

f Total Phosphoric Acid found 22.33, valued at 3½ cents per pound.

g Total Phosphoric Acid found 22.50, valued at 3½ cents per pound.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.													
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.	Relative Value per Ton at Factory.		
RAW OR UNMIXED FERTILIZER MATERIALS.																	
5051	Mortimer, E., & Co., New York	Genuine Imported Peruvian Guano.	Wallace	R								3.60	3.92				\$32.36
Brands claiming																	
4998	Mortimer, E., & Co., New York	Genuine Imported Peruvian Guano.	Washington	R								3.50	4.25				32.58
5107	do	do	Halifax	R								3.52	3.82				32.14
5342	do	do	Mebane	R								3.36	3.43				30.45
Brands claiming																	
5702	Mortimer, E., & Co., New York	Genuine Imported Peruvian Guano.	Everetts	R								3.60	4.00				30.19
												3.30	3.48				

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; Y—lumpy; W—wet.

h Total Phosphoric Acid found 23.13, valued at 3½ cents per pound.

i Total Phosphoric Acid found 23.23, valued at 3½ cents per pound.

j Total Phosphoric Acid found 23.28, valued at 3½ cents per pound.

k Total Phosphoric Acid found 23.28, valued at 3½ cents per pound.

l Total Phosphoric Acid found 22.10, valued at 3½ cents per pound.

II.—ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Ammonia Found.
2003	Battleboro Oil Co., Battleboro, N. C. -----	Battleboro -----	8.36
986	-----do -----	-----do -----	8.16
2038	-----do -----	-----do -----	8.05
973	-----do -----	-----do -----	8.02
988	-----do -----	-----do -----	7.68
2002	-----do -----	-----do -----	7.50
995	-----do -----	-----do -----	7.46
2080	-----do -----	-----do -----	8.03
2081	-----do -----	-----do -----	7.66
2032	Bragaw, William & Co., Washington, N. C. -----	Washington -----	7.54
968	Chatham Cotton Oil Co., Pittsboro, N. C. -----	Pittsboro -----	8.02
957	Clayton Oil Mill, Clayton, N. C. -----	Clayton -----	7.60
2011	-----do -----	-----do -----	7.50
2044	Consumers Cotton Oil Co., Tarboro, N. C. -----	Tarboro -----	7.38
981	Cotton Oil and Ginning Co., Scotland Neck, N. C. -----	Scotland Neck -----	7.72
2056	-----do -----	Palmyra -----	7.68
2031	Dunn Oil Mill Co., Dunn, N. C. -----	Roseboro -----	7.99
2023	Elba Manufacturing Co., Charlotte, N. C. -----	Charlotte -----	8.05
959	-----do -----	Hickory -----	7.32
2043	Farmers Cotton Oil Co., Wilson, N. C. -----	Enfield -----	8.09
2058	-----do -----	Elm City -----	8.05
977	Fremont Oil Mill Co., Fremont, N. C. -----	Fremont -----	7.94
992	Havens' Oil Co., Washington, N. C. -----	Washington -----	7.60
2009	-----do -----	-----do -----	8.11
2045	-----do -----	Franklinton -----	7.50
2006	Hertford Cotton Oil Co., Hertford, N. C. -----	Elizabeth City -----	7.58
990	Laurinburg Oil Co., Laurinburg, N. C. -----	Laurinburg -----	8.12
983	Lenoir Oil and Ice Co., Kinston, N. C. -----	Kinston -----	8.72
975	-----do -----	-----do -----	8.58
954	-----do -----	-----do -----	8.36
955	-----do -----	-----do -----	8.32
970	-----do -----	-----do -----	8.30
993	-----do -----	-----do -----	8.28
953	-----do -----	-----do -----	8.24
998	-----do -----	-----do -----	8.08
2040	-----do -----	-----do -----	8.13
985	Louisburg Cotton Oil Mill, Louisburg, N. C. -----	Wake Forest -----	8.21
2037	-----do -----	Louisburg -----	7.36
965	North Carolina Cotton Oil Co., Charlotte, N. C. -----	Charlotte -----	7.44
2053	-----do -----	Lumber Bridge -----	7.97
956	North Carolina Cotton Oil Co., Henderson, N. C. -----	Henderson -----	7.96
2029	-----do -----	Scotland Neck -----	7.83
966	-----do -----	Raleigh -----	8.20
2037	-----do -----	Wake Forest -----	7.56
2055	-----do -----	Raeford -----	7.72
2015	-----do -----	Whiteville -----	7.68
2016	-----do -----	Warsaw -----	7.64
987	Pine Level Oil Mill, Pine Level, N. C. -----	Pine Level -----	8.66
2048	-----do -----	Smithfield -----	7.95
967	Pitt County Oil Co., Winterville, N. C. -----	Winterville -----	8.36
2007	-----do -----	Greenville -----	8.11

ANALYSES OF COTTON-SEED MEAL—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Ammonia Found.
952	Planters Cotton-seed Oil Co., Rocky Mount, N. C.	Rocky Mount	7.94
962	do	do	7.78
2064	do	do	7.99
997	Red Springs Oil and Fertilizer Co., Red Springs, N. C.	Red Springs	7.96
976	Rowland Oil and Fertilizer Co., Rowland, N. C.	Rowland	7.74
2027	Royster, F. S., Guano Co., Tarboro, N. C.	Everett	8.18
2035	Southern Cotton Oil Co., Charlotte, N. C.	Gibson Station	7.89
2008	do Conetoe, N. C.	Washington	7.68
2047	do	Conetoe	7.66
2034	do Goldsboro, N. C.	Magnolia	7.73
2033	do	Goldsboro	7.73
2026	do	Enfield	7.95
2025	do Rocky Mount, N. C.	Rocky Mount	7.99
2046	do	do	7.54
2049	do Selma, N. C.	Smithfield	7.48
958	do Wilmington, N. C.	Mount Olive	7.66
2010	do Wilson, N. C.	Edenton	7.02
2028	do	Tillery	7.26
2030	do	Black Creek	7.72
969	Spring Hope Cotton Oil Co., Spring Hope, N. C.	Spring Hope	7.86
974	Verner Oil Co., Lattimore, N. C.	Lattimore	8.30
2005	Virginia-Carolina Chemical Co., Richmond, Va.	Edenton	8.25
2022	Wrendale Oil Mill Co., Battleboro, N. C.	Battleboro	8.40
982	do	do	7.94
999	do	do	7.48

III. FERTILIZER BRANDS REGISTERED FOR 1906.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The American Agricultural Chemical Co., New York, N. Y.—</i>			
Zell's 10 Trucker.....	5	10	3
Zell's 7 Per Cent Potato and Vegetable Manure...	6	7	5
Zell's Truck Grower.....	7	5	5
Zell's Special Compound for Potatoes and Vege- tables	8	3	4
Zell's Tobacco Fertilizer	8	3	4
Zell's Bright Tobacco Grower.....	8	3	3
Zell's Reliance High Grade Manure.....	8	3	3
Zell's Victoria Animal Bone Compound.....	9	2.25	4
Zell's Magnet	8	2.50	2
Zell's Royal High Grade Fertilizer.....	9	2.50	2
Zell's Fish Guano	8	2	2
Zell's Calvert Guano	8	2	2
Zell's Animal Bone Superphosphate.....	8	2	1
Zell's High Grade Potash Fertilizer.....	10	..	4
Zell's Electric Phosphate.....	10	..	2
Zell's Dissolved Bone Phosphate.....	14	..	..
Reese Dissolved Phosphate of Lime.....	14	..	..
Reese Crown Phosphate and Potash.....	11	..	2
Reese Pacific Guano	8	2	2
Reese Pacific Guano for Tobacco.....	8.50	3	2.50
Maryland Globe Complete Manure.....	8	2	2
Maryland Dissolved S. C. Bone.....	14	..	..
Lazaretto Challenge Fertilizer.....	8	3	3
Lazaretto Special for Tobacco and Peanuts.....	8	3	3
Lazaretto Universal Compound	8	2.50	2
Lazaretto Climax Plant Food.....	8	2.50	3
Lazaretto Retriever Animal Bone Fertilizer.....	9	2.25	4
Lazaretto Crop Grower	8	2	2
Lazaretto High Grade Dissolved Bone and Potash,	12	..	5
Lazaretto Alkaline Bone Phosphate	12	..	3
Lazaretto Dissolved Bone and Potash	10	..	2
Lazaretto Acid Phosphate	14	..	..
Slingluff's British Mixture	8	2.50	2.50
Clark's Orinoco Tobacco Fertilizer.....	8	3	4
Detrick's Special Tobacco Fertilizer.....	8	3	4
Detrick's Quickstep Bone Phosphate.....	8	3	4
Detrick's Special High Grade	8	3	3
Detrick's Vegetable Ammonia Superphosphate....	8	2.50	3
Detrick's Soluble Bone Phosphate and Potash....	10	..	2
Detrick's P. & B. Special Fertilizer.....	12	..	3
Detrick's Fish Mixture	8	2	2
Detrick's Royal Crop Grower	8	2	2
Detrick's Kangaroo Komplete Kompound.....	8	2	3
Detrick's Superior Animal Bone Fertilizer.....	9	2.25	4
Detrick's XXtra Acid Phosphate	14	..	..
Square Deal Phosphate for General Crops.....	8	2	4
Canton Chemical Baker's Dissolved S. C. Bone....	14	..	..
Canton Chemical Soluble Bone and Potash.....	10	..	2
Canton Chemical Soluble Alkaline Bone.....	12	..	3
Canton Chemical Game Guano.....	8	2	2
Canton Chemical Colonial Compound.....	9	2	2
Canton Chemical Animal Bone Fertilizer.....	9	2.25	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Canton Chemical Virginia High Grade Manure...	8	2.50	2
Canton Chemical Baker's Standard High Grade Guano	8	2.50	3
Canton Chemical Baker's Tobacco Fertilizer.....	8	3	3
Canton Chemical Superior High Grade Guano....	8	3	3
Canton Chemical Excelsior Trucker.....	7	5	2
Canton Chemical Trucker's Special 7 Per Cent Guano	6	7	5
16 Per Cent Superphosphate	16	..	..
Kainit .....	..	..	12
Triumph Alkaline Bone.....	8	..	5
W. P. Baugham's Honey Pod Pride.....	8	4	5
W. P. Baugham's Cottage Grove Special Trucker..	6	9	4
Young's Melon Fertilizer.....	10	3	10
Savage, Son & Co.'s Purity Guano.....	8	2	2
Holmes & Dawson Triumph Soluble.....	8	2	2
Holmes & Dawson Gold Dust Guano.....	9	2	2
Holmes & Dawson Productive Cotton and Peanut Grower.....	9	2.25	2
Victor Bone and Potash.....	8	..	3
Ground Fish Scrap.....	..	11	..
Pure Ground Bone..... (Total)	45	4	..

George L. Arps & Co., Norfolk, Va.—

Big Yield Guano	8	2	2
14 Per Cent Acid-Phosphate.....	14	..	..
High Grade Premium Guano for Cotton, Tobacco and all Spring Crops.....	8	2	2
Kainit .....	..	..	12
Arp's Potato Guano.....	6	7	5
Arp's Standard Truck Guano.....	7	5	5

Atlantic Chemical Co., Norfolk, Va.—

Atlantic Soluble Guano	8	2	2
Atlantic H. G. Cotton Guano.....	8	3	3
Atlantic Special Guano	8	2	1
Atlantic Cotton Grower	8	2.50	1
Atlantic Meal Compound	9	2.75	2
Atlantic H. G. Tobacco Guano.....	8	3	3
Atlantic Tobacco Compound	8	2.50	2
Atlantic Tobacco Grower	8	2.50	3
Atlantic 7 Per Cent Truck Guano.....	7	7	7
Atlantic Special Truck Guano.....	8	4	4
Atlantic Potato Guano	7	5	5
Atlantic Special Wheat Fertilizer.....	8	2	2
Atlantic Bone and Potash Mixture.....	10	..	2
Atlantic 10 and 4 Bone and Potash Mixture.....	10	..	4
Atlantic 8 and 2 Bone and Potash Mixture.....	8	..	2
Atlantic 8 and 4 Bone and Potash Mixture.....	8	..	4
Atlantic Bone and Potash for Grain.....	10	..	3
Atlantic H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Atlantic 14 Per Cent Acid Phosphate.....	14	..	..
Atlantic H. G. Dissolved Bone.....	13	..	..
Atlantic Acid Phosphate	12	..	..
Oriental H. G. Guano	8	4	4
Perfection Peanut Grower	7	..	5
Genuine German Kainit .....	..	..	12
Nitrate of Soda .....	..	19	..
Muriate of Potash .....	..	..	48

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Sulphate of Potash .....	..	..	50
Cotton-seed Meal .....	..	7.50	..
Atlantic H. G. Cotton Guano.....	8	3	3

Anderson Phosphate and Oil Co., Anderson, S. C.—

Anderson High Grade Phosphate.....	13
Anderson Special Dissolved Bone.....	14	..	..
Anderson Blood and Bone Guano.....	8	2	2
Anderson Soluble Guano	8	2	1
Anderson Truck Fertilizer	8	4	4
Anderson Cotton Fertilizer.....	8	2	2
Anderson Blood Guano	8	2	2
Anderson Wheat Grower	8	2	2
Anderson Special Fertilizer	8	3	3
Anderson High Grade Petrified Bone and Potash..	10	..	4
Anderson Special Petrified Dissolved Bone.....	15	..	..
Anderson Petrified Bone and Potash.....	10	..	2
Anderson Standard Petrified Bone Guano.....	8	2	2
Anderson XX Potash Bone.....	10	..	2
Anderson XXX Potash Bone.....	8	..	4
Anderson XXXX Potash Bone.....	10	..	4
Anderson Superphosphate	16	..	..
Anderson Kainit .....	..	..	12

A. D. Adair & McCarty, Atlanta, Ga., and Chattanooga, Tenn.—

David Harum High Grade Guano.....	10	4	4
Adair's High Grade Blood and Bone.....	10	3	3
Adair's High Grade Dissolved Bone No. 16.....	16	..	..
Adair's Special Potash Mixture	8	..	4
Adair's Wheat and Grass Grower.....	10	..	4
Adair's High Grade Potash Compound.....	10	..	4
Adair's High Grade Dissolved Bone.....	14	..	..
Adair's Dissolved Bone.....	12	..	..
McCarty's Potash Formula	12	..	2
McCarty's Potash Formula No. 4.....	12	..	4
McCarty's High Grade Cotton Grower.....	10	2	2
Planter's Soluble Fertilizer	8	2	2
A. & M. 13-3	13	..	3
A. & M. 13-4	13	..	4
Adrian's Ammoniated Dissolved Bone.....	8	2	2
Special Cotton Compound	10	2	4
Old Fine Fish Scrap Guano.....	10	2	2

American Fertilizer Co., Norfolk, Va.—

Ten Per Cent Ammonia Guano.....	7	10	2.50
Standard 7 Per Cent Ammonia Guano.....	7	7	5
Special Potato Manure	6	5	7
American Irish Potato Grower	7	5	5
American 7-7-7 for Irish Potatoes	7	7	7
Special Potato Guano	7	5	7
Strawberry Guano	9	3.50	9
Kale, Spinach and Cabbage Guano.....	7	5	4
Low Grade Special Formula Guano.....	7	4	4
Stable Manure Substitute	7	3	4
American Ammoniated Bone	8	2	1
Peruvian Mixture	8	2	1.50
Bone and Peruvian Guano.....	8	2	2
Bone and Peruvian Guano for Tobacco.....	8	2	2
Blood and Bone Compound	8	2.50	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
American Cotton Compound	8	2	2
American Eagle Guano	8	3	3
Bob White Fertilizer for Tobacco	8	2.50	2.50
J. G. Miller & Co.'s Yellow Leaf Fertilizer.....	8	3	3
A. L. Hannah Special Formula Guano.....	8	2	2
Special Formula Guano for Yellow Leaf Tobacco..	9	3.50	5
Murray's Special Fertilizer	8	3	3
Pitt County Special Fertilizer	9	3.50	5
Peruvian Mixture Guano, especially prepared for sweet potatoes	8	4	5
Johnson's No. 1 Fertilizer	8	2.50	3
High Grade Acid Phosphate	14	..	..
American High Grade Acid Phosphate.....	16	..	..
Eagle High Grade Acid Phosphate.....	13	..	..
Acid Phosphate	12	..	..
Acid Phosphate	10	..	..
Bone and Peruvian Guano	8.50	2	2.10
American Special Potash Mixture for Wheat.....	8	..	4
Dissolved Bone and Potash for Corn and Wheat..	10	..	2
Double Dissolved Bone and Potash.....	10	..	4
Pure Dissolved Bone	14	2.50	..
Bone Meal	21	3.50	..
Tankage.....	..	7	..
Ground Fish Scrap .....	..	10	..
Genuine German Kainit .....	..	..	12
Sulphate of Potash .....	..	..	49
Muriate of Potash.....	..	..	50
Sulphate of Ammonia .....	..	25	..
Nitrate of Soda .....	..	19	..
W. B. Cooper's Cape Fear Acid.....	12	..	..
W. B. Cooper's High Grade Fertilizer.....	8	3	3
W. B. Cooper's Cotton Grower.....	8	2	2
W. B. Cooper's High Grade Acid.....	14	..	..
W. B. Cooper's Pure German Kainit.....	..	..	12

Ashepool Fertilizer Co., Charleston, S. C.—

Ashepool Fertilizer	9	2.25	1
Ashepool Harrow Brand Raw Bone Superphos- phate.....	.9	2	2
Ashepool Wheat and Oat Specific.....	9	2	1
Ashepool XXX Guano.....	8.65	2	2
Ashepool XX Guano	8.50	2	2
Ashepool Fruit Grower	8	4.75	2.75
Ashepool Perfection Guano	8	4	6
Ashepool High Grade Guano.....	8	4	4
Ashepool Golden Tobacco Producer.....	8	3	3
Ashepool Bird and Fish Guano.....	8	3	3
Ashepool X Tobacco Fertilizer.....	8	3	3
Ashepool Meal Mixture	8	3	3
Ashepool Special Cotton-seed Meal Guano.....	8	3	3
Ashepool High Grade Ammoniated Superphosphate,	8	3	2
Ashepool Circle Guano.....	8	2.50	2
Ashepool Guano	8	2.50	1
Ashepool Special Fertilizer	8	2	2
Ashepool Farmers' Special.....	8	2.50	3
Ashepool Truck Guano	7	5	5
Ashepool Vegetable Guano.....	5	5	5
Ashepool High Grade Acid Phosphate and Potash..	12	..	1
Ashepool Potash Acid Phosphate.....	11	..	1
Ashepool Potash Compound	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Ashepool Superpotash Acid Phosphate.....	11	..	4
Ashepool Dissolved Phosphate	16	..	..
Ashepool XXXX Acid Phosphate.....	14	..	..
Ashepool XXX Acid Phosphate.....	13	..	..
Ashepool High Grade Acid Phosphate.....	13	..	..
Ashepool Dissolved Bone	12	..	..
Ashepool XX Acid Phosphate.....	12	..	..
Eutaw XX Acid Phosphate.....	12	..	..
Eutaw High Grade Acid Phosphate.....	13	..	..
Eutaw Superpotash Acid Phosphate.....	10	..	4
Eutaw Potash Acid Phosphate.....	11	..	1
Eutaw High Grade Phosphate and Potash.....	12	..	1
Eutaw Circle Guano.....	8	2.50	2
Eutaw X Golden Fertilizer.....	8	3	4
Eutaw Special Cotton-seed Meal Guano.....	8	3	4
Eutaw XX Guano	8.50	2	2
Eutaw XXX Guano.....	9	2	2
Eutaw Fertilizer	9	2.25	1
Enoree Acid Phosphate and Potash.....	10	..	2
Carolina High Grade Acid Phosphate.....	13	..	..
Carolina Guano	8	2	2
Carolina XXX Guano.....	8	3	3
Circle Bone	13	..	..
Coomassie Acid Phosphate.....	12	..	..
Coomassie Circle Fertilizer.....	8	2	2
Bronwood Acid Phosphate	8	..	4
P. D. Fertilizer	8	2	1
Palmetto Potash Acid Phosphate.....	11	..	1
Taylor's Circle Guano.....	9	2	4
German Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	45
Ashepool Watermelon Guano.....	10	4	5

Acme Manufacturing Co., Wilmington, N. C.—

Acme Acid Phosphate Rock.....	13
Acme High Grade Acid Phosphate.....	14	..	..
Acme Special Grain	8	2	2
Acme Fertilizer	8	3	2.50
Acme Truck Grower.....	6	4	8
Acme Fertilizer for Tobacco.....	8	3	2.50
Acme Soluble Guano.....	8	2.50	1
Acme Standard Guano.....	8	2.50	2
Acme Cotton Grower	9	2.75	2
Acme High Grade Guano.....	6	6	8
Tip Top Crop Grower.....	8	2.50	3
Pee Dee Special.....	8	3	3
Gem Fertilizer	8	2	2
Quick Step Fertilizer.....	8	4	4
Lattimore's Complete Fertilizer.....	8	2.50	2
Cotton-seed Meal Guano.....	8	2	2
Acid Phosphate	12	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Strawberry Top Dresser.....	8	2	4
Bone and Potash 11 and 2.....	11	..	2
Bone and Potash 8 and 4.....	8	..	4
Bone and Potash 8 and 3.....	8	..	3
Bone and Potash 8 and 2.....	8	..	2
Bone and Potash 10 and 4.....	10	..	4
Bone and Potash 10 and 3.....	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bone and Potash 10 and 2.....	10	..	2
Pure German Kainit.....	12
Nitrate of Soda 18 Per Cent.....	..	18	..
Muriate of Potash	48
Sulphate of Potash	48

The Armour Fertilizer Works, Baltimore, Md.—

13 Per Cent Acid Phosphate.....	13	..	..
Star Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Phosphate and Potash	10	..	2
Phosphate and Potash No. 2.....	8	..	5
Superphosphate and Potash	10	..	4
Wheat Grower	10	..	4
Phosphoric Acid and Potash.....	10	..	5
General	8	2	2
Fruit and Root Crop Special.....	8	2	5
High Grade Potato.....	8	2	10
Bone and Dissolved Bone and Potash.....	9	2	3
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Cotton Special	8	3	3
Ammoniated Bone with Potash.....	6	3	2
Tobacco Special	8	3	3
African Cotton Grower.....	9	3	3
Truck and Berry Special.....	8	3	10
Manure Substitute	6	4	4
Special Trucker	8	4	4
Bone, Blood and Potash.....	8	5	7
All Soluble	8	3.50	4
7 Per Cent Trucker.....	6	7	5
Top Dresser	5	10	2
10 Per Cent Trucker.....	5	10	3
Acidulated Bone Meal.....	18	12	..
Bone Meal	(Total) 24	3	..
Raw Bone	(Total) 23	4.50	..
Dried Blood .....	..	16	..
German Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Fish Mixture	8	2	2
Blood and Bone.....	8	3	3
Tankage	9	8	..
Fish Scrap	7	11	..
Kainit .....	..	..	16

Asheville Packing Co., Asheville, N. C.—

Zimmerman's Blood and Bone Fertilizer.....	10.46	4.34	2.80
Zimmerman's Standard	9.30	3.80	2.80
Zimmerman's Wheat and Potato Fertilizer.....	6.45	3.67	3.31
Zimmerman's Garden Fertilizer.....	8	5	5
Zimmerman's Tobacco Grower.....	8	3	3
Zimmerman's Bone Phosphate.....	13	..	..
Farmer's Potato Grower.....	7	2	7
Rose's Clover Fertilizer.....	12	..	4
Richard's Wheat Grower.....	8	..	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Miss Eva's XXXX Fertilizer.....	9	5	4
Sternberg's Wheat Mixture.....	10	..	4
Asheville Packing Co.'s Corn Fertilizer.....	8	2	1
Bone Potash.....	10	..	4
<i>Baugh & Sons Co., Norfolk, Va.—</i>			
Glover's Special Potato Guano.....	7	4	8
Baugh's Dissolved Animal Bone.....	13	2.50	..
Baugh's New Process 10 Per Cent Guano.....	5	10	2.50
Baugh's 7 Per Cent Potato Guano.....	6	7	5
Baugh's Cabbage Guano.....	6	7	5
Baugh's Peruvian Guano Substitute.....	6	5	7
Baugh's Fruit and Berry Guano.....	8	3	10
Baugh's High Grade Tobacco Guano.....	8	..	3
Baugh's Grand Rapid Guano.....	8	3	3
Grand Rapid High Grade Truck Guano.....	8	3	3
Baugh's Animal Bone and Potash Compound for all crops	8	2	2
Baugh's Wheat Fertilizer for Wheat and Grass...	8	2	2
Baugh's Fish Mixture	8	2	2
Baugh's Soluble Alkaline Superphosphate.....	10	..	2
Baugh's High Grade Potash Mixture.....	10	..	4
Baugh's Double Eagle Twenty-five Phosphate, or Raw Bone Superphosphate.....	8	2	1
Baugh's Peruvian Guano Substitute, for Potatoes and all vegetables.....	6	5	7
Baugh's Raw Bone Meal, warranted pure (Total),	21.50	4.50	..
Baugh's High Grade Acid Phosphate.....	14	..	..
16 Per Cent Acid Phosphate	16	..	..
Fish Bone and Potash.....	8	4	4
Ground Fish .....	..	10	..
Genuine German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
<i>Baltimore Fertilizer Co., Baltimore, Md.—</i>			
Honest Potato and Tomato Grower.....	8	3	3
Honest Trucker	6	5	5
Honest Revenue	7	3	6
Honest Sweet Potato Grower.....	8	2	4
Honest Dixie Crop Grower.....	8	2	2
Honest Albemarle Trucker	6	5	7
<i>The John L. Bailey Co., Elm City, N. C.—</i>			
Stag Brand	8	2	2
Fair Mount	8	3	3
<i>J. A. Benton, Ruffin, N. C.—</i>			
N. C. Bright Fertilizer.....	9	2	2
<i>Bradley Fertilizer Co., Boston, Mass., and Charleston, S. C.—</i>			
B. D. Sea Fowl Guano.....	9	2.25	1
Bradley's Patent Superphosphate.....	9	2.25	1
Bradley's High Grade Guano.....	8	3	3
Bradley's X Guano	8	2	2
Bradley's Ammoniated Dissolved Bone.....	8	2.25	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bradley's Eagle Ammoniated Bone Superphosphate	8	2.25	1
Bradley's Cereal Guano.....	8	2	2
Bradley's Wheat Grower.....	10	..	2
Bradley's High Grade Acid Phosphate.....	14	..	..
Bradley's XXX Acid Phosphate.....	13	..	..
Bradley's Acid Phosphate.....	12	..	..
Bradley's Palmetto Acid Phosphate.....	12	..	..
German Kainit .....	..	..	12
Bradley's Bone and Potash.....	10	..	2
<i>James Bonday, Jr., & Co., Baltimore, Md.—</i>			
Old Reliable Brand Genuine German Kainit....	..	..	12
No. 1 Syndikat Muriate of Potash.....	..	..	50
No. 1 Syndikat Sulphate of Potash.....	..	..	48
Nitrate of Soda.....	..	18	..
<i>Battleboro Oil Co., Battleboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Resolute Acid Phosphate.....	16	..	..
Laurel Potash Mixture.....	10	..	2
Berkley Plant Food.....	10	..	4
Berkley Acid Phosphate.....	14	..	..
Berkley Ammoniated Superphosphate.....	8	2	1
Select Crop Grower	8.50	2.50	2.50
Brandon Superphosphate	8	2	2
Monitor Animal Bone Fertilizer.....	9	2.25	4
Berkley Tobacco Guano.....	8	3	3
Advance Crop Grower.....	8	3	3
Victory Special Crop Grower.....	7	4	4
Royal Truck Grower.....	6	7	5
Mascot Truck Guano.....	7	5	5
Berkley Bone and Potash Mixture.....	11	..	2
Berkley Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
<i>Big Lick Cotton Seed Oil Mill Co., Big Lick, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Acid Phosphate	14	..	..
Burton's High Grade.....	8	2.50	3
Burton's Butcher Bone.....	8	2	2
Burton's Carolina Guano.....	8	2	1
Burton's Best	8	3	3
Burton's Soluble Guano.....	8	2	1
Tobacco Queen	8	3	3
High Grade Tobacco.....	8	4	4
<i>William Bragaw & Co., Washington, N. C.—</i>			
Tar Heel Special Guano.....	8	2	2
Pamlico Trucker	7	5	8
Havana Tobacco Guano.....	8	3	3
Beaufort County Guano.....	8	3	3
Tuckahoe Tobacco Guano.....	8	2.50	3
Chocowinity Special Tobacco.....	5	4	6
Old reliable Premium.....	8	2	2
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Blackstone Guano Co., Blackstone, Va.—</i>			
Red Letter	8	2	2
Alliance for Tobacco.....	8	2	2
Old Bellefonte	8	4	2
Bellefonte	8	3	2
Hard Cash	8	2.50	2
Alliance	8	2	2
B. G. Co. Acid Phosphate.....	14	..	..
B. G. Co. Bone and Potash.....	10	..	2
Jim Crow	8	3	2
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano	8	3	3
Cotton-seed Meal .....	..	7.50	..
<i>Columbia Guano Co., Norfolk, Tarboro, Columbia, S. C., Macon, Ga.—</i>			
Olympia Cotton Guano.....	8	3	3
Columbia Soluble Guano.....	8	2	2
Columbia C. S. M. Special.....	9	2.75	2
Columbia H. G. Special Tobacco Guano.....	8	2.50	2
Columbia 7 Per Cent Truck Guano.....	7	7	7
Columbia Special Truck Guano.....	8	4	4
Columbia Potato Guano.....	7	5	5
Columbia Special 4-8-3.....	8	4	3
Columbia Special Wheat Fertilizer.....	8	2	2
Columbia Bone and Potash Mixture.....	10	..	2
Columbia 10-4 Bone and Potash Mixture.....	10	..	4
Columbia 8-2 Bone and Potash Mixture.....	8	..	2
Columbia 8-4 Bone and Potash Mixture.....	8	..	4
Columbia Bone and Potash for Grain.....	10	..	3
Columbia H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Columbia 14 Per Cent Acid Phosphate.....	14	..	..
Columbia Acid Phosphate.....	12	..	..
Columbia H. G. Dissolved Bone.....	13	..	..
Rex Brand Ammoniated Guano.....	8	2.50	1
Crown Brand Peanut Guano.....	7	..	5
Carolina Soluble Guano.....	8	2	1
Pelican Ammoniated Guano.....	8	4	4
Hyco Tobacco Guano.....	8	3	3
McRae's High Grade Guano.....	8	4	7
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	48
Nitrate of Soda.....	..	19	..
Columbia 8-2.25 Bone and Potash Mixture.....	8	..	2.25
Columbia Special	8	4	3
McRae's Special	8	5	7
Hayes' Special	8	4	3
Crews' Special	5.85	5.45	10
<i>Cumberland Bone Phosphate Co., Portland, Me., and Charleston, S. C.—</i>			
Cumberland Bone Superphosphate of Lime.....	8	2.25	1
<i>Cotton Oil and Fibre Co., Norfolk, Va.—</i>			
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Consumers Cotton Oil Co., Tarboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Chatham Cotton Oil Co., Pittsboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Campobello Oil Mill, Campobello, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>The Cotton and Ginning Co., Scotland Neck, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Chickamauga Cotton Compound.....	10	2	4
Chickamauga High Grade Plant Food.....	10	2	2
Chickamauga High Grade Fertilizer.....	10	2	2
Chickamauga Complete Fertilizer.....	8	2	2
Chickamauga Alkaline Bone.....	8	..	4
Chickamauga Bone and Potash.....	10	..	2
Chickamauga Wheat and Corn Grower.....	10	..	4
Chickamauga Dissolved Bone.....	12	..	2
Chickamauga High Grade Dissolved Bone.....	14	..	..
Chickamauga High Grade Dissolved Bone No. 16..	16	..	..
Chickamauga 12-2	12	..	2
Chickamauga 12-4	12	..	4
Chickamauga 13-4	13	..	4
Chickamauga 13-2	13	..	2
Ben Hur High Grade Guano.....	10	3	3
Georgia Homestead Guano.....	8	2	2
Chickamauga Fish Scrap Guano.....	10	2	2
<i>Calder Bros., Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
<i>W. B. Cooper, Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	50
<i>Cowell, Swan & McCotter Co., Bayboro, N. C.</i>			
Cowell, Swan & McCotter Co.'s Cabbage Guano...	5	10	2.50
Cowell, Swan & McCotter Co.'s Great Cabbage and Potato Guano	7	7	7
Cowell, Swan & McCotter Co.'s Oriental Trucker..	6	6	6
Cowell, Swan & McCotter Co.'s H. G. Truck Guano,	7	5	5
Cowell, Swan & McCotter Co.'s Potato Favorite Guano	7	4	7
Cowell, Swan & McCotter Co.'s Champion Guano..	8	3	3
Cowell, Swan & McCotter Co.'s Quick Grower Guano	8	2.50	3
Cowell, Swan & McCotter Co.'s Standard Cotton Grower	8	4	3
Cowell, Swan & McCotter Co.'s Rust Proof Cotton Guano.....	8	2	3
Cowell, Swan & McCotter Co.'s Bone and Fish Guano	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Cowell, Swan & McCotter Co.'s Crop Grower.....	8	2	2
Cowell, Swan & McCotter Co.'s 14 Per Cent Acid Phosphate	14	..	..
Cowell, Swan & McCotter Co.'s Bone Phosphate..	14	..	..
Cowell, Swan & McCotter Co.'s Bone Potash Com- pound	10	..	2
Cowell, Swan & McCotter Co.'s Fish and Kainit Compound	5	4	3
German Kainit .....	..	..	12
Aurora Trucker	7	5	7
<i>The Coc-Mortimer Co., Charleston, S. C.—</i>			
Peruvian Guano Ex Condor.....	8.50	8.30	2
Peruvian Guano Ex Coya.....	9	9	2
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	49
<i>Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—</i>			
Crown Ammoniated Guano.....	8	2	1.50
Comet Guano	8	2	1
Planters' Pride	8	2.50	3
Eli Ammoniated Guano.....	8	2	2
Eclipse Ammoniated Guano.....	8	2.50	2
Horne's Best	8	3	3
Caraleigh Special Tobacco Grower.....	8	2.50	3
Dandy Acid Phosphate.....	10	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Climax Dissolved Bone.....	14	..	..
Staple Acid Phosphate.....	12	..	..
Sterling High Grade Acid Phosphate.....	13	..	..
Electric Bone and Potash.....	10	..	2
Horne & Son's High Grade Bone and Potash....	11	..	5
Morris & Scarboro's Special Bone and Potash Mix- ture	10	..	3
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Pacific Tobacco and Cotton Grower.....	9	2.75	2
<i>W. H. Camp, Petersburg, Va.—</i>			
Camp's Prepared Chemicals No. 1.....	8	3.50	7.50
Camp's Prepared Chemicals No. 3.....	8	2.75	2
Camp's Prepared Chemicals for Irish Potatoes....	7	7.50	10
Camp's Bone and Potash.....	10	..	4
Camp's Special for Tobacco.....	8	3	3
<i>Crow Fertilizer Co., Monroe, N. C.—</i>			
Crow's Union County Special.....	8	2	2
Crow's H. G. Blood and Fish.....	8	3	3
Crow's 14 Per Cent Acid Phosphate.....	14	..	..
Crow's Kainit .....	..	..	12
<i>Dixie Guano Co., Durham, N. C.—</i>			
Niagara Soluble Bone.....	8	2.50	2
Battle's Blood and Bone.....	8	2.50	3
Dixie Champion for Wheat and Corn.....	10	..	1.50
Dixie Star Ammoniated 8-2-1.....	8	2	1
Jeff Davis Special.....	9	2.75	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Carolina Special Ammoniated.....	8	3	3
Radium	8	4	5
Sulky Plow Brand.....	8	3	2
Old Plantation Superphosphate.....	8	2	2
<i>Etiwan Fertilizer Co., Charleston, S. C.—</i>			
Plow Brand Ammoniated Dissolved Bone.....	8.65	2	2
Plow Brand Raw Bone Superphosphate.....	8	2.50	1
Plow Brand Special Tobacco Fertilizer.....	8	4	4
Plow Brand Acid Phosphate with Potash.....	11	..	1
Plow Brand Ammoniated Fertilizer.....	8	2	2
Etiwan Soluble Bone with Potash.....	10	..	3
Etiwan Cotton Compound.....	8	3	3
Etiwan Ammoniated Fertilizer.....	8	2	2
Etiwan Superior Cotton Fertilizer.....	8	4	6
Etiwan High Grade Acid Phosphate.....	14	..	..
Etiwan Dissolved Bone.....	13	..	..
Etiwan Ammoniated Dissolved Bone.....	8.65	2	2
Etiwan Potash Bone.....	10	..	4
Etiwan Special Potash Mixture.....	8	..	4
Etiwan Acid Phosphate with Potash.....	11	..	1
Etiwan High Grade Cotton Fertilizer.....	8	3	2
Etiwan Blood and Bone Guano.....	8	2.50	1
Diamond Soluble Bone.....	13	..	..
Diamond Soluble Bone with Potash.....	10	..	2
XX Acid Phosphate with Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
<i>Eureka Fertilizer Co., Perryville, Md.—</i>			
Potato Special	8	2.50	3
Camden Special	6	5	7
Alkaline Bone and Potash.....	10	..	2
Farmers' Favorite Bone Phosphate.....	8	2	2
Seven Per Cent Trucker.....	7	7	7
5 Per Cent Alkaline Bone and Potash.....	12	..	5
<i>Fairforest Oil Mill, Fairforest, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Fremont Oil Mill Co., Fremont, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Farmers Cotton Oil Co., Wilson, N. C.—</i>			
Dean's Special Guano.....	8	4.50	7
Golden Gem Guano.....	8	3	3
Planter's Friend Guano.....	8	2.50	3
Carolina Choice Tobacco Guano.....	8	2.50	3
Wilson High Grade Guano.....	8	2.75	2
Farmer's Special Guano.....	8	2	2
Crop King Guano.....	8	2	2
XTra Good Bone and Potash.....	10	..	2
Regal Acid Phosphate.....	12	..	..
Contentnea Acid Phosphate.....	13	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Bonum Acid Phosphate.....	14	..	..
J. D. Farrior's Special Guano for Cotton and Tobacco	8	3	3
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Cotton-seed Meal .....	..	8	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Perfect Top Dresser for all Crops.....	2	10	5
Wilson Top Dresser.....	2	11	4
<i>Farmers Guano Co., Raleigh, N. C.—</i>			
State Standard Guano.....	8	2	2
Toco Tobacco Guano.....	8	2.50	3
Big Crop Guano.....	8	2.50	3
Golden Grade Guano.....	8	3	3
Century Bone and Potash Mixture.....	10	..	2
Farmers' High Grade Acid Phosphate.....	13	..	..
16 Per Cent Acid Phosphate.....	16	..	..
14 Per Cent Acid Phosphate.....	14	..	..
<i>W. S. Farmer & Co., Baltimore, Md.—</i>			
Dissolved South Carolina Bone.....	14	..	..
Fish Mixture	8	2	2
Kainit .....	..	..	12
Anne Arundel Trucker.....	7	4.50	8
Top Dresser	5	5	5
Hawkeye	8	3	3
Clyde Brand	8	2	1
Truckers' Compound	8	3	4
Tampico	7	5	5
Strawberry Mixture	9	5	5
W. S. Farmer & Co.'s Standard Phosphate.....	10	2.50	2.50
<i>Farmers Oil Mill, Newberry, S. C.—</i>			
Cotton Seed Meal.....	..	7.50	..
<i>Griffith & Boyd, Baltimore, Md.—</i>			
Accomac Trucker.....	6	5	7
Spring Crop Grower.....	6.50	2	4.50
Nitro Crop Feeder.....	9	2.50	..
Double Strength Tobacco Grower.....	8	3	3
Vegetable Bone	8	3	7
7 Per Cent Guano.....	5	7	5
Stable Manure Substitute.....	5	3.50	4
Ammoniated Bone Phosphate.....	8	2	2
High Grade Acid Phosphate.....	12	..	..
Genuine German Kainit.....	..	..	12
<i>The Home Fertilizer Chemical Works, Baltimore, Md.—</i>			
Boykin's Home Potato Grower.....	6	4	4
Cerealite Top Dressing.....	..	9	2.50
Boykin's Vegetable Fertilizer.....	6	5	6
Phoenix Crop Grower.....	8	3	2
Boykin's Cereal Fertilizer.....	8	2	2
Boykin's Dissolved Animal Bone.....	12	2	..
Yancey's Formula for Yellow Leaf Tobacco.....	8	3	2
Boykin's Alkaline Bone.....	10	..	2
Boykin's High Grade Acid Phosphate.....	14	..	..
Home Fertilizer .....	..	7	7
Boykin's Royal Potato Fertilizer.....	6	7	5
German Kainit .....	..	..	12
Nitrate of Soda.....	..	19	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Muriate of Potash .....	..	..	50
Sulphate Ammonia .....	..	25	..
Boykin's Excelsior Acid Phosphate.....	16	..	..
<i>Hardison Co., Wadesboro, N. C.—</i>			
Genuine German Kainit.....	..	..	12
Nitrate of Soda .....	..	18	..
<i>S. B. Harrell & Co., Norfolk, Va.—</i>			
Harrell's Truck Guano.....	6	7	5
Harrell's Champion Cotton and Peanut Grower..	8	2	2
Harrell's Acid Phosphate.....	14	..	..
<i>Hadley, Harris & Co., Wilson, N. C.—</i>			
Hadley's Boss Guano.....	8	2.75	2.50
John Hadley's Special H. G. Plant Food.....	8	2	2
Daisy Guano	8	2	2
<i>Hall & Pearsall, Wilmington, N. C.—</i>			
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
<i>The Hampton Guano Co., Norfolk, Va.—</i>			
Dauntless Potash Mixture.....	10	..	2
Supreme Acid Phosphate 16 Per Cent.....	16	..	..
Hampton Crop Grower.....	10	..	4
Hampton Bone and Potash Mixture.....	11	..	2
Hampton Acid Phosphate.....	14	..	..
Hampton Ammoniated Superphosphate.....	8	2	1
Alpha Crop Grower.....	8.50	2.50	2.50
Shirley Superphosphate	8	2	2
Arlington Animal Bone Fertilizer.....	9	2.25	4
Little's Favorite Crop Grower.....	7	4	4
P. P. P. Princess Prolific Producer.....	8	3	3
Reliance Truck Guano.....	7	5	5
Virginia Truck Grower.....	6	7	5
Hampton Tobacco Guano.....	8	3	3
Hampton Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
<i>The Hubbard Fertilizer Co., Baltimore, Md.—</i>			
Hubbard's Trucker's 7 Per Cent Royal Seal Com- pound	6	7	5
Hubbard's Trucker's 10 Per Cent Guano.....	4	10	4
Hubbard's Jersey Trucker.....	8	2	10
Hubbard's 5 Per Cent Truck Guano.....	6	5	5
Hubbard's Yellow Wrapper Guano.....	8	3	3
Hubbard's Standard Bone Superphosphate.....	8	2	3
Hubbard's Soluble Bone and Potash.....	10	..	2
Hubbard's Royal Ensign.....	8	3	4
Hubbard's Exchange Guano.....	8	2	2
Hubbard's Special Mixture of Bone and Potash..	10	..	4
Hubbard's H. G. Soluble Tennessee Phosphate....	14	..	..
German Kainit .....	..	..	12
Lang's Favorite	8	2.50	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial X. L. O. for Cotton.....	8	3	3
Imperial Tobacco Guano.....	8	3	3
Imperial Cubanola Tobacco Guano.....	4	3	5
Imperial Champion Guano.....	8	2	2
Imperial Peanut and Corn Guano.....	8	2	2
Imperial Cisco Soluble Guano.....	8	2	2
Imperial 10 Per Cent Guano.....	5	10	2.50
Imperial Standard Premium Guano.....	8	2	1.50
Imperial 5-6-7 Potato.....	6	5	7
Imperial Special 7 Per Cent for Potatoes and Early Truck.....	5	7	5
Imperial Laughinghouse Special Tobacco Guano..	4	4	6
Imperial Cotton Grower.....	8	2	1.50
Imperial Martin County Special Guano.....	9	2.75	2
Imperial High Grade Irish Potato.....	7	5	8
Imperial Williams' Special Potato.....	6	5	5
Imperial Fish and Bone Guano.....	6	4	4
Imperial H. G. Acid Phosphate.....	14	..	..
Imperial H. G. Tennessee Acid Phosphate.....	16	..	..
Imperial Guano for Bright Tobacco.....	8	2.50	3
Imperial Bone and Potash.....	10	..	2
Imperial German Kainit.....	..	..	12
Asparagus Mixture.....	..	6.50	7
Imperial Great Grain Grower for Wheat, Corn and Oats.....	10	..	3
Imperial General Crop Grower.....	8	2	1
Imperial Best Bone and Potash.....	10	..	4
Imperial 13 Per Cent Acid Phosphate.....	13	..	..
Imperial Top Dresser for Cotton.....	9	2.50	2
Imperial Catawba Wheat Grower.....	10	..	4
Imperial Yadkin Wheat Grower.....	8	..	2
Imperial Virginia Grain Mixture.....	10	..	2
Imperial Carolina Wheat Mixture.....	10	..	3
<i>Jonesville Oil Mill, Jonesville, S. C.—</i>			
Cotton-seed Meal.....	..	8	..
<i>Ketcham Fish and Fertilizer Co., Manteo, N. C.—</i>			
Ketcham's Fish Extract for Potatoes.....	5	4	5
Ketcham's Standard Corn Grower.....	5	6	3
<i>Lister's Agricultural Chemical Works, Newark, N. J.—</i>			
Lister's Standard Bone Superphosphate of Lime..	9	2	2
Lister's Ammoniated Dissolved Bone Fertilizer...	8	2.50	2
Lister's Success Fertilizer.....	8	2	2
<i>Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.—</i>			
Cotton-seed Meal.....	..	7.50	..
<i>Louisburg Cotton Oil Co., Louisburg, N. C.—</i>			
Cotton-seed Meal.....	..	7.50	..
<i>Laurinburg Oil Co., Laurinburg, N. C.—</i>			
Cotton-seed Meal.....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>A. S. Lee & Sons Co., Richmond, Va.—</i>			
Lee's High Grade Bone and Potash.....	9	..	4
Lee's Special Wheat Fertilizer.....	8	..	2
Lee's Prepared Agricultural Lime.....	..	..	2
Lee's German Fruit Grower.....	4	3	6
Lee's Plant Bed Fertilizer.....	8	2	2
Lee's Special Corn Fertilizer.....	8	..	2
Lee's Rice Grower	8	..	3
Imported Thomas' Basic Slag.....	16	..	..
<i>E. H. & J. A. Meadows Co., New Bern, N. C.—</i>			
Meadows' Diamond Acid Phosphate.....	14	..	..
Meadows' Great Cabbage Guano.....	7	7	7
Meadows' All Crop Guano.....	8	2.50	2.50
Meadows' Great Potato Guano.....	7	5	8
Meadows' Labos Guano	8	5	5
Meadows' Cotton Guano	8	2	2
Meadows' 10 Per Cent Ammoniated Guano.....	6	10	2.50
Meadows' Sea Bird Guano.....	9	4	2.50
Meadows' Roanoke Guano.....	8	2.50	3
Meadows' Gold Leaf Tobacco Guano.....	8	3	3
Meadows' Genuine German Kainit.....	..	..	12
Dixon's Cotton Guano	8	2	2
Dixon's High Grade Tobacco Guano.....	8	3	3
<i>The D. B. Martin Co., Philadelphia, Pa.—</i>			
Martin's Claremont Vegetable Grower.....	7	3	5
Martin's Bull Head Fertilizer.....	8	3	3
Martin's Carolina Cotton Fertilizer.....	8	2	2
Martin's Early Truck and Vegetable Grower.....	6	4	8
Pure Dissolved Bone.....	12	2	..
Martin's Pure Ground Bone..... (Total)	22.90	2	..
Martin's Pure Raw Bone Meal..... (Total)	21.00	4.50	..
Martin's High Grade Kainit.....	..	..	12
Martin's Acid Phosphate.....	14	..	..
Martin's Potash and Soluble Bone.....	12	..	3
Potash and Soluble Bone.....	12	..	5
Potash and Soluble Bone.....	10	..	4
Potash and Soluble Bone.....	10	..	2
Acid Phosphate	13	..	..
<i>Thos. Meehan & Sons, Germantown, Philadelphia, Pa.—</i>			
Meehan's Canada Hardwood Ashes.....	..	5.32	..
Meehan's Bone Meal..... (Total)	20.93	3.50	..
<i>The Miller Fertilizer Co., Baltimore, Md.—</i>			
Special Tobacco Grower.....	8	2	4
Standard Phosphate	8	3	3
Miller's Irish Potato.....	8	4	4
Ammoniated Dissolved Bone.....	8	2	2
High Grade Potato.....	6	5	7
Tobacco King	8	3	3
Standard Potato	8	2	2
Potato and Vegetable Grower.....	8	2	4
Cotton Queen	8	2	1
Trucker	8	5	5
S. C. Rock	14	..	..
Grain and Grass Grower.....	8	2	1
Profit	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Potash Mixture	10	..	4
Farmer's Profit	8	2	2
Corn and Peanut Grower.....	10.50	..	2.25
Harmony	8	2.50	3
Clinch	10	..	2
Kainit .....	..	..	12
Miller's 7 Per Cent.....	7	7	7
Miller's 16 Per Cent Acid Phosphate.....	16	..	..
Four Per Cent Tobacco.....	8	4	4
No. 1 Potato and Vegetable Grower.....	8	4.50	7
<i>Marsh-Lee Co., Marshville, N. C.—</i>			
Marsh's Special High Grade for all Crops.....	8	3	3
Marsh's Guano for Corn.....	8	2	2
Marsh's Cotton Fertilizer.....	8	2	2
<i>The Mapes Formula and Peruvian Guano Co., New York.—</i>			
The Mapes Corn Manure.....	8	3	6
The Mapes Economic Potato Manure.....	4	4	8
The Mapes Complete Manure "A" Brand.....	10	3	2.50
The Mapes Soluble Potato Manure.....	2	7	5
The Mapes Vegetable Manure or Complete Manure for Light Soils.....	6	6	6
<i>Madison Oil Mill, Madison, N. C.—</i>			
Cotton Seed Meal.....	..	7.50	..
<i>The MacMurphy Co., Charleston, S. C.—</i>			
Special 9-3-3 Guano.....	9	3	3
Special 8-5-7 Guano.....	8	5	7
Special 8-3-3 Cotton and Corn Guano.....	8	3	3
Standard 8-2½-1 Cotton Guano.....	8	2.50	1
Doubly Ammoniated Truck Farmers' Special Guano	8	8	4
Truck Farmers' Special Guano.....	10	4	4
Special 8-4-4 Tobacco Guano.....	8	4	4
Truckers' Special 6-5-6 Vegetable Guano.....	6	5	6
Wilcox, Gibbs & Co.'s Manipulated Guano.....	9	2.75	2
Special 8-2-2 Cotton and Corn Guano.....	8	2	2
Special 8-3-3 Tobacco Guano.....	8	3	3
Truckers' Special Potato Guano.....	7	4	5
High Grade Acid Phosphate.....	13	..	..
Acid Phosphate and Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	18	..
Sulphate of Potash.....	..	..	48
Muriate of Potash.....	..	..	48
<i>N. C. Cotton Oil Co., Charlotte, N. C.—</i>			
Majestic	8	2	2
<i>North Carolina Cotton Oil Co., Henderson, N. C.—</i>			
Pride of Vance Tobacco Fertilizer.....	9	3	3
Vance Cotton Grower.....	8	2	2
Franklin Cotton Grower.....	8	2	2
Henderson Cotton Fertilizer.....	8	2	2
Franklin Tobacco Fertilizer.....	9	3	3
Henderson Tobacco Fertilizer.....	9	3	3
Unedit Tobacco Fertilizer.....	9	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>North Carolina Cotton Oil Co., Wilmington, N. C.—</i>			
Wilmington Special	8	2	2
Carter's Lifter	8	3	3
<i>North Carolina Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8	2.75	2
<i>Norfolk Fertilizer Co., Norfolk, Va.—</i>			
High Grade Acid Phosphate.....	14	..	..
Oriana Cotton Grower.....	8	2	2
Genuine German Kainit .....	..	..	12
C. S. M. Special Crop Grower.....	9	2.75	2
8-3-3 Cotton Grower.....	8	3	3
Tobacco Grower	8	3	3
Bone Potash	10	..	2
Mayodan Valley Wheat Grower.....	8	..	4
Iola Acid Phosphate.....	13	..	..
Young's Grain Grower.....	10	..	2
Shenandoah Wheat Mixture.....	10	..	3
Whitney H. G. Acid Phos.....	16	..	..
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
Pamlico Electric Top Dresser.....	5	10	2.50
Dunn's Standard Truck Grower.....	7	7	7
Ives' Irish Potato Guano.....	7	5	7
Lenoir Bright Leaf Tobacco Grower.....	8	3	3
Craven Bright Tobacco Guano.....	8	3	3
Craven Cotton Guano	8	2	2
Pitt's Prolific Golden Tobacco Guano.....	8	3	3
Foy's High Grade Fertilizer.....	8	3	3
Onslow Farmers' Reliance Guano.....	8	2.50	3
Jones County Premium Crop Grower.....	8	2.50	3
Greene County Standard Fertilizer.....	8	2	2
Carteret Bone and Potash.....	10	..	2
Fourteen Per Cent Acid Phosphate.....	14	..	..
Genuine German Kainit .....	..	..	12
Pot Neck Tobacco Guano.....	8	4	4
Bogue Fish Scrap.....	4	9	..
Muriate Potash .....	..	..	48
Nitrate Soda .....	..	19	..
Sulphate Ammonia .....	..	25	..
Sulphate of Potash.....	..	..	48
<i>Navassa Guano Co., Wilmington, N. C.—</i>			
Ammoniated Soluble Navassa Guano.....	8	2.50	2
Clarendon Tobacco Guano	8	3	3
Navassa High Grade Guano.....	8	3	3
Occoneechee Tobacco Guano	8	2	2
Coree Tobacco Guano	8	4	4
Harvest King Guano.....	8	2	3
Navassa Complete Fertilizer.....	8	2	1
Navassa Cotton Grower.....	8	2	2
Navassa Cotton-seed Meal Guano.....	8	2	2
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8	3	2
Navassa Fruit Growers' Fertilizer.....	8	2	6
Navassa Grain Fertilizer.....	8	2	2
Navassa Guano for Tobacco.....	8	2.50	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Navassa Carib Guano.....	8	3	10
Navassa Root Crop Fertilizer.....	7	5	7
Navassa Creole Guano.....	6	5	7
Navassa Special Truck Guano.....	8	4	4
Navassa Blood and Meal Mixture.....	8	3	5
Navassa Strawberry Top Dressing.....	8	2.50	4
Navassa Universal Fertilizer.....	8	2	1
Navassa 16 Per Cent Acid Phosphate.....	16	..	..
Navassa 14 Per Cent Acid Phosphate.....	14	..	..
Navassa High Grade Dissolved Bone.....	13	..	..
Navassa Acid Phosphate.....	12	..	..
Croatan Acid Phosphate	10	..	..
Harvey's Bone and Potash Mixture.....	8	..	3
Navassa Acid Phosphate with Potash.....	10	..	1
Navassa Bone and Potash.....	8.50	..	2
Navassa Dissolved Bone with Potash.....	10	..	2
Navassa Gray Land Mixture.....	12	..	4
Navassa Special Wheat Mixture.....	12	..	4
Navassa Wheat and Grass Grower.....	10	..	4
Navassa Wheat Mixture.....	10	..	2.25
Navassa Worlick's Mixture.....	8	..	2.25
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
Cotton-seed Meal .....	..	7.50	..
Nitrate of Soda.....	..	19	..

G. Ober & Sons Co., Baltimore, Md.—

Ober's Dissolved Bone Phosphate.....	14	..	..
Ober's Dissolved Bone Phosphate and Potash....	10	..	2
Ober's Acid Phosphate with Potash.....	8	..	4
Ober's Complete Fertilizer.....	6	5	6
Ober's Special Compound for Tobacco.....	8	3	3
Ober's Standard Tobacco Fertilizer.....	8	2	2
Ober's Special High Grade Fertilizer.....	9	3	3
Ober's Special Ammoniated Dissolved Bone.....	9	2	2
Ober's Special Cotton Compound.....	8	2	2
Kainit .....	..	..	12
Muriate of Potash .....	..	..	48
Nitrate of Soda .....	..	18	..
Cooper's Pungo Guano.....	8	2.50	2

Powhatan Chemical Co., Richmond, Va.—

Powhatan Trucker	7	6	5
North State Special.....	8	4	4
P. C. Co.'s Hustler.....	8	3	3
Economic Cotton Grower	9	2.75	2
White's Leaf Tobacco Grower.....	8	2.50	3
King Brand Fertilizer.....	8	2.50	3
Magic Tobacco Grower	8	2	2
Magic Special Fertilizer	8	2	2
Magic Cotton Grower.....	8	2	2
Magic Guano Mixture.....	8	2	1
Guilford Special Tobacco Fertilizer.....	9	3	6
Magic Bone and Potash Mixture.....	10	..	4
Powhatan Bone and Potash Mixture.....	8	..	4
Magic Grain and Grass Grower.....	8	..	4
Magic Peanut Grower	8	..	4
Magic Bone and Potash.....	10	..	2
Dixie Grain and Grass Grower.....	8	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Magic Dissolved Bone Phosphate.....	16	..	..
Uneeda Acid Phosphate.....	15	..	..
High Grade Acid Phosphate.....	14	..	..
Powhatan Acid Phosphate	13	..	..
Virginia Dissolved Bone.....	12	..	..
Magic S. C. Phosphate.....	10	..	..
Pure Raw Bone Meal..... (Total)	20	4	..
Bone Meal	25	3	..
Pure German Kainit .....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..
<i>Pacific Guano Co., Boston, Mass., Charleston, S. C.—</i>			
Soluble Pacific Guano	8.50	2	2
Pacific Special High Grade Fertilizer.....	8	3	3
Pacific Acid Phosphate	12	..	..
<i>Pinetop Supply Co., Pinetop, N. C.—</i>			
Pinetop Standard	8	2	2
<i>Pine Level Oil Mill Co., Pine Level, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
High Grade	8	3	3
Pine Level Mixture.....	8	2	2
Cotton Grower	8	2	2
Olive Cotton Grower.....	8	3	3
<i>The Pocomoke Guano Co., Norfolk, Va.—</i>			
Superb Acid Phosphate 16 Per Cent.....	16	..	..
Pamlico Superphosphate	8	2	2
Peerless Acid Phosphate	14	..	..
Electric Crop Grower	8.50	2	2
Pocomoke Superphosphate	8.50	2	2
Hornthal Tobacco Guano.....	8	2	2
L. P. H. Premium.....	8	2	2
Crescent Complete Compound	8	2	2
Cinco Tobacco Guano	8.50	2.50	2.50
Monarch Tobacco Grower	8	3	3
Monticello Animal Bone Fertilizer.....	9	2.25	4
Harvey's High Grade Monarch.....	8	3	3
Faultless Ammoniated Superphosphate.....	7	4	4
Seaboard Popular Trucker	6	7	5
Standard Truck Guano.....	7	5	5
Freeman's 7 Per Cent Irish Potato Grower.....	6	7	5
Coast Line	5	10	3
Pocomoke Bone and Potash Mixture.....	10	..	4
10-2 Potash Mixture.....	10	..	2
Alkali Bone	11	..	2
Genuine German Kainit .....	..	..	12
Pure Ground Bone..... (Total)	20	4.50	..
Nitrate of Soda .....	..	19	..
Muriate of Potash.....	..	..	50
<i>Pocahontas Guano Co., Lynchburg, Va.—</i>			
Carrington's Superior Grain Compound.....	10	..	2
Carrington's Banner Brand Guano.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Carrington's No. 3 Grain Grower.....	10	..	3
Carrington's S. C. Phosphate (Waukeshaw Brand),	16	..	..
Pocahontas Special Tobacco Fertilizer.....	9	3	3
High Grade 4 Per Cent Tobacco Compound (Mo- hawk King)	9	2.25	4
Yellow Tobacco Special.....	9	2	2
Standard Tobacco Guano (Old Chief Brand).....	9	2	2
Farmers' Favorite Guano (Apex Brand).....	8	3	3
Grain Special Bone and Potash (New Rival Brand)	10	..	1.65
Imperial Dissolved S. C. Phosphate.....	14	..	..
Red Bear Special	8	2.50	3
Black Hawk Brand	8	2.50	2
Big Joe Brand	8	2	1
Wabash Wheat Mixture	10	..	4
Cherokee Grain Special.....	8	..	4
Pure Raw Bone Meal..... (Total)	22	4.50	..
Swann Cotton Grower	9	2	2
Spot Cash Tobacco Compound.....	8	2.50	3
Indian Truck Grower.....	8	4	4

Patapsco Guano Co., Baltimore, Md.—

Patapsco Special Tobacco Mixture.....	8	2.50	3
Patapsco Guano	9.25	2.50	2
Patapsco Guano for Tobacco.....	9.25	2.50	2
Patapsco Tobacco Guano.....	9	3	3
Patapsco Trucker for Early Vegetables.....	7	5	5
Patapsco Crop Dresser.....	4	4	4
Patapsco Potato Guano	6	5	7
Patapsco 7-7-7 Truck Guano.....	7	7	7
Patapsco 10-4 Potash Mixture.....	10	..	4
Patapsco High Grade Bone and Potash.....	11	..	5
Patapsco Soluble Bone and Potash.....	10	..	2
Patapsco Dissolved S. C. Phosphate.....	14	..	..
Patapsco Money Maker Guano.....	7	4.50	6
Florida Soluble Phosphate.....	16	..	..
Planters' Favorite	8	2	2
Choctaw Guano	8	3	3
Unicorn Guano	8	2.50	3
Baltimore Soluble Phosphate.....	11	..	2
Sea Gull Ammoniated Guano.....	8	2	2
Pilot Guano Special 4 Per Cent.....	10	2.50	4
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
Fine Ground Bone..... (Total)	20.61	4	..
Dried Blood .....	..	13.44	..
Ground Fish .....	..	11	..

Piedmont-Mt. Airy Guano Co., Baltimore, Md.—

Piedmont Potato Producer.....	5	3	6
Piedmont Special Truck Fertilizer.....	6	7	5
Piedmont Cultivator Brand.....	8	2	2
Piedmont Farmers' Standard	9	2	2
Piedmont Essential Tobacco Compound.....	9	2	2
Piedmont High Grade S. C. Phosphate.....	14	..	..
Piedmont High Grade Ammoniated Bone and Potash.....	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Piedmont Special for Cotton, Corn and Peanuts...	8	2	2
Piedmont Special Farmers' Tobacco Guano.....	8.40	3	4
Piedmont Guano for Tobacco.....	8	2.50	3
Piedmont Farmers' High Grade Bone and Potash,	10	..	2
Piedmont Bone and Peruvian Mixture.....	8	2	2
Piedmont Soluble Bone and Potash.....	8	..	2
Piedmont Guano for Cotton.....	8	2	1
Piedmont Early Vegetable Manure.....	6	5	7
Piedmont Special Potash Mixture.....	10	..	5
Levering's Reliable Tobacco Guano.....	8	3	3
Levering's Potashed Bone.....	10	..	4
Genuine German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	18.50	..
Privott's Standard Guano.....	8	2.50	3
High Grade Acid Phosphate.....	14	..	..
Wood's 4 Per Cent Acid Phosphate.....	14	..	..
Wood's Potato Guano.....	6	5	7
Wood's Cotton Grower.....	8	2	2
Wood's Corn Fertilizer.....	10	..	2
Piedmont Guano for all crops.....	8	2.50	3
Piedmont Fish Guano.....	8	2	2
Piedmont High Grade Truck Fertilizer.....	6	4	6
Privott's Special for Potato and Vegetables.....	8	2	6
Privott's 3-8-4 Guano.....	8	3	4

The Quinnipiac Co., New York, Charleston, S. C.—

Quinnipiac Pine Island Ammoniated Superphos- phate.....	9	2.25	1
Quinnipiac Acid Phosphate.....	13	..	..

*F. S. Royster Guano Co., Norfolk, Tarboro, Columbia,
and Macon, Ga.—*

Farmers' Bone Fertilizer.....	8	2	2
Marlborough H. G. Cotton Grower.....	8	3	3
Special Compound.....	8	2	1
Caledonia Compound.....	8	2	1
Arrow Brand Guano.....	8	2.50	1
Royster's Meal Mixture.....	9	2.75	2
Bonanza Tobacco Guano	8	3	3
Orinoco Tobacco Guano.....	8	2.50	3
Special Tobacco Compound.....	8	2.50	2
Cobb's High Grade for Tobacco.....	8	5	6
Williams' Tobacco Guano.....	6	3	6
Royster's Special 10 Per Cent Truck Guano.....	5	10	3
Royster's Early Truck Guano.....	7	5	8
Royster's Special 7 Per Cent Truck Guano.....	7	7	7
Trucker's Delight	8	4	4
Royal Potato Guano.....	7	5	5
Ballentine's Potato Guano	6	7	7
Royal Special Potato Guano.....	7	5	7
Royster's Special Sweet Potato Guano.....	8	3	3
Royster's Special 8-4-3.....	8	4	3
Royster's Special Wheat Fertilizer.....	8	2	2
Tomlinson's Special	9	3	5
Royster's Peanut Special.....	7	..	5
Royster's Bone and Potash.....	10	..	2
Royster's 10 and 4 Bone and Potash Mixture....	10	..	4
Royster's 8 and 2 Bone and Potash Mixture.....	8	..	2
Royster's 8 and 4 Bone and Potash Mixture.....	8	..	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Royster's Bone and Potash for Grain.....	10	..	3
Royster's H. G. 16 Per Cent Acid Phosphate....	16	..	..
Royster's 14 Per Cent Acid Phosphate.....	14	..	..
Royster's H. G. Dissolved Bone.....	13	..	..
Royster's XX Acid Phosphate.....	12	..	..
Magic Top Dressing.....	..	9	2.50
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	48
Royster's Special	8	4	3
Royster's 8 and 2.25 Bone and Potash Mixture....	8	..	2.25
Royster's Best Guano.....	8	4	7
Harvey's Cabbage Guano.....	5	8	3
Royster's Complete Fertilizer.....	8	2	2
Humphries' Special for Tobacco.....	6	3.10	3.20
Williams' Special Guano.....	8	2.50	5

Read Phosphate Co., Charleston, S. C.—

Read's High Grade Acid Phosphate.....	13
Read's High Grade Cotton Grower.....	8	3	3
Read's High Grade Manipulated Guano.....	9	2	3
Read's Soluble Fish Guano.....	8	2	2
Read's Cotton Flower.....	8	2.50	1
Read's High Grade Tobacco Leaf.....	8	3	3
Read's Alkaline Bone	10	..	2
Read's Special Potash Mixture.....	8	..	4
Read's High Grade Dissolved Bone.....	14	..	..
Read's Bone and Potash.....	10	..	4
Genuine German Kainit.....	..	..	12

J. H. Roberson & Co., Robersonville, N. C.—

Roberson's Potato Grower.....	6	7	5
Roberson's Cotton Grower.....	9	2.75	2
Roberson's High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
Roberson's Bright Leaf Grower.....	8	2.50	3

Richmond Guano Co., Richmond, Va.—

10 Per Cent Cabbage Guano.....	6	10	2
Special High Grade for Truck.....	7	6	5
Southern Trucker	8	5	5
Perfection Special	8	4	4
Gilt Edge Fertilizer.....	8	3	3
Carolina Cotton Grower.....	9	2.75	2
Carolina Bright Special Tobacco Fertilizer.....	8	2.75	2.50
Tip Top Fertilizer.....	8	2.50	3
Special Premium Brand for Tobacco.....	8	2.25	2.25
Special Premium Brand for Plants.....	8	2.25	2.25
Carolina Bright for Cotton.....	8	2.50	1.50
Premium Tobacco Fertilizer.....	8	2	2
Premium Brand Fertilizer.....	8	2	2
Edgecombe Cotton Grower	8	2	2
Bone Mixture	8	2	1
Clark's Special Formula.....	7	6	6
Carter's Special Tobacco Fertilizer.....	4	3	6
Saunders' Special Formula for Bright Tobacco....	9	3.50	5
Burton's Special Tobacco Fertilizer.....	9	2.50	3
Premium Bone and Potash Mixture.....	13	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Rex Bone and Potash Mixture.....	10	..	4
Tip Top Bone and Potash Mixture.....	8	..	4
Winter Grain and Grass Grower.....	8	..	4
Premium Peanut Grower.....	8	..	4
Bone and Potash Mixture.....	10	..	2
Premium Grain and Grass Grower.....	8	..	2
Rex Dissolved Bone Phosphate.....	16	..	..
High Grade Acid Phosphate.....	14	..	..
High Grade Wheat and Grass Fertilizer.....	14	..	..
Premium Dissolved Bone.....	13	..	..
Dissolved S. C. Phosphate.....	12	..	..
Old Homestead Dissolved Bone.....	10	..	..
Hunter & Dunn's Dissolved Bone.....	13	..	..
Hunter & Dunn's Special Ammoniated Fertilizer..	9	3	2.25
Hunter & Dunn's Ammoniated Fertilizer.....	8	2	2
Pure Raw Bone Meal..... (Total)	20	4	..
Bone Meal (Total)	25	3	..
Pure German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
Sulphate of Ammonia.....	..	24	..
Nitrate of Soda .....	..	19	..
<i>Red Springs Trading Co., Red Springs, N. C.—</i>			
Kainit .....	..	..	12
<i>Reidsville Fertilizer Co., Reidsville, N. C.—</i>			
Lion Brand Fertilizer.....	9	3	6
Champion Guano	8	2	2
Royal Fertilizer	8	3	3
Banner Fertilizer	8	2	1
Broad Leaf Tobacco Guano.....	8	2.25	2.50
Bone and Potash 10-4.....	10	..	4
Bone and Potash 8-2.....	8	..	2
<i>Rasin Monumental Co., Baltimore, Md.—</i>			
Rasin Acid Phosphate.....	14	..	..
Rasin Bone and Potash.....	10	..	2
Rasin Special Bone and Potash.....	10	..	5
Rasin Empire Guano.....	8	2	2
Rasin Dixie Guano.....	8	2	1
Rasin Gold Standard Guano.....	8	3	3
Rasin 13 Per Cent Acid Phosphate.....	13	..	..
Rasin 16 Per Cent Acid Phosphate.....	16	..	..
Rasin Acid Phosphate	14	..	..
<i>Red Springs Oil and Fertilizer Co., Red Springs, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Rocky Mount Guano Co., Rocky Mount, N. C.—</i>			
Tar River Special.....	8	2.50	3
Royal Cotton Grower.....	9	2.75	2
Eagle Guano	8	2	2
<i>Rowland Oil and Fertilizer Co., Rowland, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Roanoke Fertilizer and Chemical Co., Roanoke, Va.—</i>			
Farmer's Joy	8	2	4
<i>Oliver Smith Co., Wilmington, N. C.—</i>			
Genuine Peruvian Guano Ex. S. S. Hanseat (Total)	23	3.60	4.25
Genuine Peruvian Guano Ex. P. O. Condor (Total)	9	8.30	2
Nitrate of Soda.....	..	18	..
Genuine German Kainit.....	..	..	12
<i>Southern Cotton Oil Co., Rocky Mount, Charlotte, Fayetteville, Wilson, Tarboro, Monroe, Gastonia, Davidson, Shelby, Goldsboro, Concord, Gibson, Conctoe, N. C., Union, S. C., Spartanburg, S. C., Columbia, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Southern Exchange Co., Maxton, N. C.—</i>			
Two-Four Guano.....	7	4	4
That Big Stick Guano.....	8	3	4
Bull of the Woods Fertilizer.....	8	3	4
Jack's Best Fertilizer.....	8	3	3
Correct Cotton Compound.....	8	3	3
R. M. C. Special Crop Grower.....	8	3	3
Juicy Fruit Fertilizer.....	9	2.25	4
The Walnut Fertilizer.....	8.50	2.50	2.50
The Racer Guano.....	8	2	3
The Coon Guano.....	8	2	2
McKimmon's Special Truck Formula.....	8	5	7
Melon Grower	8	5	7
Genuine German Kainit.....	..	..	12
<i>The Southern Cotton Oil Co., Charlotte, Concord, Davidson, Gastonia, Monroe, Shelby, N. C.—</i>			
Conqueror	8	4	4
Moon	8	3	3
Red Bull	8	2.50	2
King Bee	8.65	2	2
Magnolia	8.65	2	2
Gloria	8	2	2
First Call	8	2.50	1
Sun Rise	8	2.50	1
Gold Seal	14	..	..
Silver King	13	..	..
Genuine German Kainit.....	..	..	12
Peacock	8	3	2
Conqueror Bone and Potash.....	10	..	4
Magnolia Bone and Potash.....	10	..	2
<i>Goldsboro, N. C.—</i>			
Best & Thompson's Special Cotton Grower.....	9	2.75	2
Goldsboro Oil Mill Special Cotton Grower.....	8	3	3
Goldsboro Oil Mill High Grade.....	8	2.75	2.50
Goldsboro Oil Mill Standard.....	8	2	2
Southern Cotton Oil Company Standard.....	8	2	2
Southern Cotton Oil Co.'s High Grade.....	8	2.75	2.50
Edgerton's Old Reliable.....	8	3	3
Genuine German Kainit.....	..	..	12

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Goldsboro, Rocky Mount, Wilson and Fayetteville, N. C.—			
High Grade Acid Phosphate.....	14	..	..
Peacock	8	3	2
Conqueror Bone and Potash.....	10	..	4
Magnolia Bone and Potash.....	10	..	2
Rocky Mount, N. C.—			
Rocky Mount Oil Mill Standard.....	8	2	2
Rocky Mount Oil Mill High Grade.....	8	2.75	2.50
Rocky Mount Special Cotton Grower.....	8	3	3
Fayetteville, N. C.—			
Fayetteville Oil Mill Standard.....	8	2	2
Fayetteville Oil Mill High Grade.....	8	2.75	2.50
Wilson, N. C.—			
Wilson Oil Mill Standard.....	8	2	2
Wilson Oil Mill Special Cotton Grower..	8	3	3
Wilson Oil Mill High Grade.....	8	2.75	2.50
Swift Fertilizer Works, Atlanta, Ga.—			
Swift's Blood, Bone and Potash H. G. Guano....	9.50	4	7
Swift's Special H. G. Guano.....	9.50	5	3
Swift's Corn and Cotton Grower H. G. Guano....	10	3	3
Swift's Monarch H. G. Guano.....	8	4	4
Swift's Cotton King H. G. Guano.....	9	3	2
Swift's Farmers' Favorite H. G. Guano.....	9	2	3
Swift's Eagle H. G. Guano.....	10	2	2
Swift's Golden Harvest Standard Grade Guano...	8	2	2
Swift's Red Steer Standard Grade Guano.....	8	2	2
Swift's Cotton Plant Standard Grade Guano....	9	2	1
Swift's Special H. G. Phosphate and Potash.....	12	..	6
Swift's Atlanta H. G. Phosphate and Potash.....	12	..	4
Swift's Farmers' Home H. G. Phosphate and Potash	10	..	4
Swift's Plantation Standard Grade Phosphate and Potash	8	..	4
Swift's Wheat Grower Standard Phosphate and Potash	10	..	2
Swift's Field and Farm Standard Grade Phos- phate and Potash.....	10	..	2
Swift's Special H. G. Acid Phosphate.....	16	..	..
Swift's Cultivator H. G. Acid Phosphate.....	14	..	..
Swift's Harrow H. G. Acid Phosphate.....	13	..	..
Swift's Chattanooga Standard Grade Acid Phos- phate	12	..	..
Swift's Pioneer H. G. Tobacco Grower.....	8	2	4
Muriate of Potash.....	..	..	50
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..
Swift's Ruralist High Grade Guano.....	8	3	3
Swift & Company, Chicago, Ill.—			
Swift's Pure Raw Bone Meal.....(Total)	23	4	..
Swift's Pure Bone Meal.....(Total)	25	3	..
Swift's Ground Dried Blood.....	16	..	..
Swift's No. 1 Ground Tankage.....	6	10	..

Name and Address of Manufacturer and Name of Brand.	Avail Phos Acid.	Am- monia.	Potash.
<i>Spartanburg Fertilizer Co., Spartanburg, S. C.—</i>			
Buenos	8	4	4
Ottora	8	2	1
Tiger Brand Acidulated Phosphate.....	14	..	..
Brown's Compound	10	..	2
Potato Guano	7	3	7
Orpheus	10	..	4
Coronaka	8	2	2
West's Potash Acid.....	13	..	3
Tiger Brand	8	2	6
Boll Buster	9	2	2
Corn Formula	10	2	5
<i>Statesville Oil and Fertilizer Co., Statesville, N. C.—</i>			
Grasoil Ammoniated Guano.....	8	2	2
Redsoil Special Ammoniated Guano.....	9	3	..
Iredell High Grade Acid Phosphate.....	14	..	..
Iredell Bone and Potash.....	10	..	3
Pure German Kainit.....	..	..	12
<i>Tuscarora Fertilizer Co., Baltimore, Md.—</i>			
13 Per Cent Acid Phosphate.....	13	..	..
Acid Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Bone and Potash.....	10	..	2
Alkaline	10	..	5
Standard	8	2	2
Big Four	7	2	2
Fruit and Potash.....	8	2	1
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Cotton Special	8	3	3
Tobacco Special	8	3	3
Manure Substitute	6	4	4
Special Trucker	8	4	4
Tuscarora Trucker	8	5	7
Animal Bone	(Total) 24	3	..
Kainit .....	..	..	12
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
Tus Alkaline	10	..	4
<i>Tyger-Shoals Milling Co., Wellford, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Taylor Manufacturing Co., Columbia, S. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>R. L. Upshur, Norfolk, Va.—</i>			
Upshur's Peanut Guano	8	2	2
Upshur's High Grade Acid Phosphate.....	14	..	..
Upshur's Fish Bone and Potash.....	8	2	4
Upshur's G. G. and C. Grain, Grass and Cotton Grower.....	8	2	2
Premo Cotton Guano.....	8	2	1.50
Upshur's Bone and Potash Guano.....	10	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Upshur's 3-8-3 Cotton Guano.....	8	3	3
Upshur's High Grade Tobacco Guano.....	8	3	3
Upshur's 5 Per Cent Guano.....	5	5	5
Upshur's Special Truck Guano.....	7	5	8
Upshur's 7 Per Cent Potato Guano.....	5	7	5
Upshur's 7 Per Cent. Irish Potato Guano.....	6	7	5
Upshur's F. C. Farmers' Challenge Guano.....	6	7	6
Upshur's F. F. Farmers' Favorite Guano.....	7	5	6
Cotton-seed Meal Mixture.....	9	2.75	2
Genuine German Kainit.....	..	..	12
<i>Universal Oil and Fertilizer Co., Wilmington, N. C.—</i>			
Cotton-seed Meal .....	..	8	..
Cotton-seed Meal .....	..	7.50	..
<i>Union Guano Co., Winston, N. C.—</i>			
Union Wheat Mixture.....	8	..	4
Union Perfect Cotton Grower.....	9	2.75	2
Union Mule Brand Guano.....	10	2	2
Union Waterfowl Guano.....	8	2.50	3
Union Homestead Guano.....	8	3	3
Union Standard Tobacco.....	8	2.50	2
Union Premium Guano	8	4	4
Union Truck Guano	7	4	5
Union Vegetable Compound.....	7	5	8
Union 16 Per Cent Acid Phosphate.....	16	..	..
Union 10 Per Cent Acid Phosphate.....	10	..	..
Union 12 Per Cent Acid Phosphate.....	12	..	..
Union High Grade Acid Phosphate.....	14	..	..
Union Dissolved Bone	13	..	..
Union 10-5 Bone and Potash.....	10	..	5
Union 10-6 Bone and Potash.....	10	..	6
Union 12-3 Bone and Potash.....	12	..	3
Union 12-4 Bone and Potash.....	12	..	4
Union 12-5 Bone and Potash.....	12	..	5
Union 12-6 Bone and Potash.....	12	..	6
Union Bone and Potash.....	10	..	2
Old Honesty Guano.....	8	2	2
Liberty Bell Crop Grower.....	10	..	1.50
Q. Q. Quality Quantity Guano.....	8	2	1
Victoria High Grade Tobacco Guano.....	8	3	3
Quaker Grain Mixture	10	..	4
Giant Phosphate and Potash.....	10	..	3
Rockingham Bone and Potash.....	8.50	..	2
Genuine German Kainit.....	..	..	12
Vulcan Ammoniated Guano.....	8	2.50	1
Roseboro's Special Potash Mixture.....	12	..	6
Sunrise Soluble Bone and Potash.....	8	..	2.25
Union Potato Mixture.....	8	2	10
Union Approved Guano.....	8.65	2	2
Murray's Special Crop Grower	8	2	2
Murray's Potash Mixture	8	..	2.25
<i>Virginia-Carolina Chemical Co., Richmond, Va.—</i>			
V. C. C. Co.'s Solid South.....	8	..	2.25
V. C. C. Co.'s 14 Per Cent Acid Phosphate.....	14	..	..
V. C. C. Co.'s 3 Per Cent Special C. S. M. Guano No. 3.....	8	3	2
V. C. C. Co.'s 16 Per Cent Acid Phosphate.....	16	..	..
V. C. C. Co.'s Standard Bone and Potash.....	10	..	5
V. C. C. Co.'s Special Truck Guano.....	6	5	7
V. C. C. Co.'s Formula 44.....	7	3.10	3.20

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
V. C. C. Co.'s Special Potash Mixture.....	10	..	4
V. C. C. Co.'s Special Crop Grower.....	12	..	3
V. C. C. Co.'s Special.....	8	4	4
V. C. C. Co.'s Invincible High Grade Fertilizer....	6	5	7
V. C. C. Co.'s High Grade Tobacco Fertilizer.....	8	3	10
V. C. C. Co.'s Lion High Grade Tobacco Fertilizer,	8	3	4
V. C. C. Co.'s Great Texas Cotton Grower Soluble			
Guano.....	9	3	4
Cock's Soluble Guano High Grade Ammoniated			
Bone.....	9	2.25	3
Adams' Special	8	3	3
Black's Best	8	3	3
Farmers' Favorite Fertilizer, C. S. M.....	8	2	2
Ajax C. S. M.....	8	2	2
Orange Grove	8	2.75	2.50
Royal Crown	8	2.75	2
Atlas Guano C. S. M.....	8	3	2.50
Wilson Standard C. S. M.....	8	2	2
Farmers' Friend Favorite Fertilizer Special.....	8.50	2	2
White Stem C. S. M.....	9	2.75	2
Special High Grade Tobacco Fertilizer C. S. M....	8	3	3
Superlative Guano C. S. M.....	8	2.50	3
Split Silk C. S. M.....	8	3	2.50
Prolific Cotton Grower.....	9	2.75	2
Plant Food	8	2	2
North State Guano C. S. M.....	8	2	1
Good Luck C. S. M.....	8	3	2.50
Blue Star C. S. M.....	8	2.50	3
Delta C. S. M.....	8	2.75	2.50
Diamond Dust C. S. M.....	8	2	2
Admiral	8	3	2.50
Winston Special for Cotton C. S. M.....	8	2	2
Sludge Acid Phosphate.....	14	..	..
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Fish Scrap .....	..	10	..
Sulphate of Potash.....	..	25	..
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	50
Nitrate of Soda.....	..	19	..
V. C. C. Co.'s Southern Cotton Grower.....	9	2.75	2
V. C. C. Co.'s Truck Crop Fertilizer.....	7	5	7
Allison & Addison's Fulton Acid Phosphate.....	14	..	..
Allison & Addison's B. P. Potash Mixture.....	10	..	2
Allison & Addison's Standard Acid Phosphate....	12	..	..
Allison & Addison's I. X. L. Acid Phosphate.....	13	..	..
Allison & Addison's Rockets Acid Phosphate.....	10	..	..
Allison & Addison's McGavock's Special Potash			
Mixture	8	..	2.25
Allison & Addison's Old Hickory Guano.....	8	2	2
Allison & Addison's A. A.....	8	3	3
Allison & Addison's Anchor Brand Fertilizer....	8	2	2
Allison & Addison's Anchor Brand Tobacco Fert..	8.50	2.75	2
Allison & Addison's Star Brand Special Tobacco			
Manure.....	9	2.75	2
Allison & Addison's Star Brand Guano.....	8	2	1
Allison & Addison's Star Brand Vegetable Guano,	8	4.50	4
Atlantic & Va. Fert. Co.'s Our Acid Phosphate....	12	..	..
Atlantic & Va. Fert. Co.'s Valley of Virginia			
Phosphate.....	14	..	..
Atlantic & Va. Fert. Co.'s Eureka Acid Phosphate,	10	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Atlantic & Va. Fert. Co.'s Crenshaw's Acid Phosphate.....	13	..	..
Atlantic & Va. Fert. Co.'s Eureka Bone and Potash Compound	10	..	2
Atlantic & Va. Fert. Co.'s Carolina Truckers'.....	7	7	7
Atlantic & Va. Fert. Co.'s Orient Spl. for Tobacco,	8	2	2
Atlantic & Va. Fert. Co.'s Eureka Ammon'd Bone,	8	2	2
Atlantic & Va. Fert. Co.'s Virginia Truckers'.....	8	5	5
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9	2.50	2
Atlantic & Va. Fert. Co.'s Orient Complete Manure.....	8	2	1
Charlotte Oil & Fert. Co.'s Catawba Acid.....	10	..	..
Charlotte Oil & Fert. Co.'s Charlotte Dis. Bone...	12	..	..
Charlotte Oil & Fert. Co.'s Charlotte 15 Per Cent Acid Phosphate	15	..	..
Charlotte Oil & Fert. Co.'s Charlotte Acid Phos...	13	..	..
Charlotte Oil & Fert. Co.'s McCrary's Diamond Bone and Potash.....	8	..	3
Charlotte Oil & Fert. Co.'s Ten-Two Bone and Potash.....	10	..	2
Charlotte Oil & Fert. Co.'s Oliver's Perfect Wheat Grower.....	11	3	4
Charlotte Oil & Fert. Co.'s Catawba Guano B. G..	8	2	1
Charlotte Oil & Fert. Co.'s Queen of the Harvest C. S. M.....	8	2	1
Charlotte Oil & Fert. Co.'s Special 3 Per Cent Guano C. S. M.....	8	3	2
Charlotte Oil & Fert. Co.'s High Grade Special Tobacco Fertilizer	9	2.50	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano B. G.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano C. S. M.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Groom's Special Tobacco Fertilizer	8	3	4
Charlotte Oil & Fert. Co.'s King Cotton Grower...	8	2	2
Charlotte Oil & Fert. Co.'s The Leader B. G.....	8	2	2
Davie & Whittle's Owl Brand Dissolved Bone...	12	..	..
Davie & Whittle's Owl Brand Acid Phosphate...	10	..	..
Davie & Whittle's Owl Brand High Grade Phos...	13	..	..
Davie & Whittle's Owl Brand High Grade Dissolved Bone	14	..	..
Davie & Whittle's Owl Brand Acid Phosphate with Potash.....	10	..	2
Davie & Whittle's Owl Brand Guano.....	8	2	2
Davie & Whittle's Owl Brand Guano No. 2.....	8	2	1
Davie & Whittle's Owl Brand Truck Guano.....	8	6	5
Davie & Whittle's Owl Brand Special Tobacco...	9	2.50	2
Davie & Whittle's Owl Brand Guano for Tobacco,	8	3	3
Davie & Whittle's Vinco Guano.....	8	2	1
Durham Fert. Co.'s Durham Acid Phosphate.....	10	..	..
Durham Fert. Co.'s Blacksburg Dissolved Bone...	13	..	..
Durham Fert. Co.'s Standard High Grade Acid Phosphate.....	13	..	..
Durham Fert. Co.'s N. C. Farmers' Alliance Official Acid Phosphate	13	..	..
Durham Fert. Co.'s Durham H. G. Acid Phosphate,	13	..	..
Durham Fert. Co.'s Excelsior Dis. Bone Phosphate,	14	..	..
Durham Fert. Co.'s Double Bone Phosphate.....	13	..	..
Durham Fert. Co.'s Diamond Wheat Mixture.....	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Durham Fert. Co.'s Blue Ridge Wheat Grower....	10	..	2
Durham Fert. Co.'s Standard Wheat Grower.....	10	..	2
Durham Fert. Co.'s Carr's Special Wheat Grower,	8	..	4
Durham Fert. Co.'s Great Wheat and Corn Grower.....	10	..	1.50
Durham Fert. Co.'s Bone and Potash Mixture.....	10	..	2
Durham Fert. Co.'s Standard Guano.....	9	2	2
Durham Fert. Co.'s Blacksburg Soluble Guano...	8	2	2
Durham Fert. Co.'s Best Potato Manure.....	7	7	7
Durham Fert. Co.'s L. & M. Special.....	9	3	2
Durham Fert. Co.'s Progressive Farmer Guano...	8	2	1
Durham Fert. Co.'s Special Plant and Truck Fert.,	8	5	3
Durham Fert. Co.'s Golden Leaf Bright Tobacco Guano.....	8	3	3
Durham Fert. Co.'s Durham Ammo'd Fertilizer...	8	2	1
Durham Fert. Co.'s N. C. Farmers' Alliance Official Guano.....	8	2.50	3
Durham Fert. Co.'s Genuine Bone and Peruvian Guano.....	8	2	2
Durham Fert. Co.'s Gold Medal Brand Guano.....	8	3	3
Durham Fert. Co.'s Raw Bone Superphosphate....	8	2.50	1.50
Durham Fert. Co.'s Genuine Bone and Peruvian Guano for Tobacco	8	2	2
Durham Fert. Co.'s Raw Bone Superphosphate for Tobacco.....	8	2.50	2
Lynchburg Guano Co.'s Golden Age Pure Bone Meal.....(Total)	20	4	..
Lynchburg Guano Co.'s Ironside Acid Phosphate..	16	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate...	12	..	..
Lynchburg Guano Co.'s Otter Brand Acid Phos...	10	..	..
Lynchburg Guano Co.'s Arvonian Acid Phosphate...	13	..	..
Lynchburg Guano Co.'s H. G. Acid Phosphate.....	14	..	..
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture	10	..	4
Lynchburg Guano Co.'s Alpine Mixture.....	10	..	5
Lynchburg Guano Co.'s Dis. Bone and Potash.....	10	..	2
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco	8	2	2
Lynchburg Guano Co.'s Lynchburg Soluble.....	8	2	2
Lynchburg Guano Co.'s New Era.....	8	2	1
Lynchburg Guano Co.'s Independent Standard.....	8.50	2	2
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8	2.75	4
Lynchburg Guano Co.'s Bright Belt Guano.....	8	2	..
Norfolk & Car. Chem. Co.'s Norfolk Reliable Acid Phosphate.....	10	..	..
Norfolk & Car. Chem. Co.'s Norfolk Best Acid Phosphate.....	13	..	..
Norfolk & Car. Chem. Co.'s Norfolk Bone and Potash.....	10	..	2
Norfolk & Car. Chem. Co.'s Crescent Brand Ammo- niated Fertilizer	8	2	1
Norfolk & Car. Chem. Co.'s Cooper's Bright To- bacco Fertilizer	8	2.50	3
Norfolk & Car. Chem. Co.'s Pretlow's Champion for Peanuts, Cotton and Corn.....	8	2	1
Norfolk & Car. Chem. Co.'s Norfolk Truck and Tomato Grower	8	5	5
Norfolk & Car. Chem. Co.'s Genuine Slaughter House Bone	8	2	2
Norfolk & Car. Chem. Co.'s Genuine Slaughter House Bone, made especially for Tobacco.....	8	2.50	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Norfolk & Car. Chem. Co.'s Bright Leaf Tobacco Grower	8	3	3
Norfolk & Car. Chem. Co.'s Amazon H. G. Manure,	8	3	3
Old Dominion Guano Co.'s Norfolk Soluble Bone..	10	..	..
Old Dominion Guano Co.'s H. G. Bone Phos.....	13	..	..
Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate	12	..	..
Old Dominion Guano Co.'s Planters' Bone and Potash Mixture	10	..	3
Old Dominion Guano Co.'s Miller's Special Wheat Mixture.....	8	..	4
Old Dominion Guano Co.'s H. G. Alkaline Bone....	10	..	2
Old Dominion Guano Co.'s Dis. Bone and Potash..	8.50	..	2
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano	6	7	5
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano	7	7	7
Old Dominion Guano Co.'s Isley's Formula of Dis- solved Bone Potash and Chemical.....	8	3	3
Old Dominion Guano Co.'s Bullock's Cotton Grower	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6	2	6
Old Dominion Guano Co.'s Osceola Tobacco Guano,	8	2.50	3
Old Dominion Guano Co.'s Soluble Tobacco Guano,	8	2	2
Old Dominion Guano Co.'s Soluble Guano.....	8	2	2
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer	8	3	3
Old Dominion Guano Co.'s Farmers' Friend Fert..	8	2	2
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano	8	2	1
Old Dominion Guano Co.'s Potato Manure.....	7	5	8
Old Dominion Guano Co.'s Farmers' Friend Spe- cial Tobacco Fertilizer	8	3	3
Powers, Gibbs & Co.'s Fulp's H. G. Acid Phos....	13	..	..
Powers, Gibbs & Co.'s Cotton Brand Acid Phos....	12	..	..
Powers, Gibbs & Co.'s Almont H. G. Acid Phos....	13	..	..
Powers, Gibbs & Co.'s Almont Wheat Mixture.....	10	..	3
Powers, Gibbs & Co.'s Cotton Brand H. G. Acid Phosphate.....	13	..	..
Powers, Gibbs & Co.'s Acid Phos. and Potash....	10	..	1
Powers, Gibbs & Co.'s Dis. Bone and Potash.....	10	..	2
Powers, Gibbs & Co.'s Cotton Belt Ammo'd Guano,	8	3	2
Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone	8	2	1
Powers, Gibbs & Co.'s Almont Soluble Ammo- niated Guano	8	2	2
Powers, Gibbs & Co.'s Powers' High Grade Ammo- niated Guano	8	2.50	2
Powers, Gibbs & Co.'s Eagle Island Ammo'd Guano,	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano.....	9	3	2
Powers, Gibbs & Co.'s Carolina Golden Belt Am- moniated Guano for Tobacco.....	8	2.50	3
Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano	8	4	5

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Powers, Gibbs & Co.'s Old Kentucky High Grade Manure.....	8	3	3
Powers, Gibbs & Co.'s Gibbs' High Grade Am- moniated Guano	8	2.50	1
Southern Chem. Co.'s Tar Heel Acid Phosphate...	12	..	..
Southern Chem. Co.'s Horse Shoe Acid Phosphate,	10	..	..
Southern Chem. Co.'s Elkin Acid Phosphate.....	12	..	..
Southern Chem. Co.'s Chatham Acid Phosphate...	13	..	..
Southern Chem. Co.'s Click's 16 Per Cent Acid Phosphate.....	16	..	..
Southern Chem. Co.'s Victor High Grade Acid Phosphate.....	13	..	..
Southern Chem. Co.'s Comet 16 Per Cent Acid Phosphate.....	16	..	..
Southern Chem. Co.'s Red Cross 14 Per Cent Acid Phosphate.....	14	..	..
Southern Chem. Co.'s Reaper Grain Application...	12	..	3
Southern Chem. Co.'s Farmers' Pride Bone and Potash.....	10	..	3
Southern Chem. Co.'s Quickstep Bone and Potash,	10	..	1
Southern Chem. Co.'s Mammoth Corn Grower.....	10	..	2
Southern Chem. Co.'s Winner Grain Mixture.....	10	..	4
Southern Chem. Co.'s Winston Bone and Potash Compound.....	10	..	2
Southern Chem. Co.'s Mammoth Wheat and Grass Grower.....	10	..	2
Southern Chem. Co.'s Sun Brand Guano.....	9	2.50	5
Southern Chem. Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8	3	2.50
Southern Chem. Co.'s Yadkin Complete Fertilizer,	8	2	1
Southern Chem. Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8	2.50	3
Southern Chem. Co.'s Electric Standard Guano...	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano.....	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano....	8	2	2
Click's Special Wheat Compound.....	8	..	4
J. G. Tinsley & Co.'s Stone Wall Brand Acid Phos.,	10	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate...	14	..	..
J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	13	..	..
J. G. Tinsley & Co.'s Bone and Potash Mixture...	10	..	2
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower,	6	4	4
J. G. Tinsley & Co.'s Stone Wall Guano.....	8	2	2
J. G. Tinsley & Co.'s Lee Brand Guano.....	8	2	2
J. G. Tinsley & Co.'s 10 Per Cent Truck Guano....	5	10	2.50
J. G. Tinsley & Co.'s Stone Wall Tobacco Guano..	8	2	2
J. G. Tinsley & Co.'s Tobacco Fertilizer.....	8	4	2.50
J. G. Tinsley & Co.'s Irish Potato Guano.....	6	6	6
J. G. Tinsley & Co.'s Richmond Brand Guano.....	8	2	1
J. G. Tinsley & Co.'s Killikinnick Tobacco Mixture,	8	2.50	3
S. W. Travers Co.'s Champion Acid Phosphate....	10	..	..
S. W. Travers Co.'s Capital Dissolved S. C. Bone,	12	..	..
S. W. Travers Co.'s Standard Dissolved S. C. Bone,	13	..	..
S. W. Travers Co.'s Dissolved Bone Phosphate...	14	..	..
S. W. Travers Co.'s Special Wheat Compound....	8	..	4
S. W. Travers Co.'s Capital Bone and Potash Compound.....	10	..	2
S. W. Travers Co.'s Beef Blood and Bone Fert...	8	2	1
S. W. Travers Co.'s Capital Cotton Fertilizer.....	8	2.50	1
S. W. Travers Co.'s Capital Truck Fertilizer.....	8	4	3
S. W. Travers Co.'s Capital Tobacco Fertilizer...	8	4	3
S. W. Travers Co.'s National Spl. Tobacco Fert...	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
S. W. Travers Co.'s National Fertilizer.....	8	2	2
Va. State Fert. Co.'s Gilt Edge Brand Pure Bone Meal.....(Total)	20	4	..
Va. State Fert. Co.'s Lurich Acid Phosphate.....	10	..	..
Va. State Fert. Co.'s Alps Brand Acid Phosphate,	12	..	..
Va. State Fert. Co.'s Clipper Brand Acid Phos...	13	..	..
Va. State Fert. Co.'s Bull Run Acid Phosphate...	16	..	..
Va. State Fert. Co.'s Gilt Edge Brand Acid Phos...	14	..	..
Va. State Fert. Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.50	..	2
Va. State Fert. Co.'s H. G. Dis. Bone and Potash,	10	..	2
Va. State Fert. Co.'s Mountain Top Bone and Potash.....	10	..	5
Va. State Fert. Co.'s XX Potash Mixture.....	10	..	4
Va. State Fert. Co.'s Bull Dog Soluble Guano.....	8	3	3
Va. State Fert. Co.'s G. E. Spl. Tobacco Grower..	8	2.50	2
Va. State Fert. Co.'s Game Cock Special Guano...	8.50	2	2
Va. State Fert. Co.'s Battle Axe Tobacco Guano..	8	2	2
Va. State Fert. Co.'s Highland King.....	8	2	1
Va. State Fert. Co.'s No. 1 Soluble Guano.....	9	2	..
Va. State Fert. Co.'s Dunnington's Special Form- ula for Tobacco.....	8	3	3
Va. State Fert. Co.'s Austrian Tobacco Grower....	8	2.50	2
Va. State Fert. Co.'s Va. State High Grade To- bacco Guano	8	2	2
Va. State Fert. Co.'s Buffalo Guano.....	8	2.50	3
Va. State Fert. Co.'s Va. State H. G. Guano.....	8	2	2

Venable Fertilizer Co., Richmond, Va.—

Venable's 10 Per Cent Trucker.....	6	10	2
Venable's 5 Per Cent Trucker.....	8	5	5
Venable's 4 Per Cent Trucker.....	8	4	4
Venable's 6-6-6 Manure	6	6	6
Venable's Ideal Manure	8	2	5
Venable's B. B. P. Manure.....	8	2	1
Venable's Alliance Bone and Potash Mixture....	8	..	4
Venable's Peanut Grower	8	..	4
Venable's Grain and Grass Grower.....	8	..	2
Venable's Alliance Acid Phosphate.....	14	..	..
Venable's Dissolved Bone Phosphate.....	13	..	..
Venable's S. C. Bone.....	10	..	..
Venable's Roanoke Special.....	8	2.50	3
Planters' Bone Fertilizer	8	2	2
High Grade Bone and Potash Mixture.....	10	..	4
Ballard's Choice Fertilizer.....	8	3	3
Roanoke Meal Mixture	9	2.75	2
Bone and Potash Mixture.....	10	..	2
Pure German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Potash .....	..	24	..
Nitrate of Soda .....	..	19	..
Pure Raw Bone Meal.....(Total)	20	4	..
Bone Meal	25	3	..
Venable's H. G. Tobacco Fertilizer.....	8	3	3

Verner Oil Mill, Lattimore, N. C.—

Cotton-seed Meal	8	..
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Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Williams & Clark Fertilizer Co., New York and Charleston, S. C.—</i>			
Americus Ammoniated Bone Superphosphate.....	8	2.25	1
<i>Wilson Grocery Co., Wilson, N. C.—</i>			
Morning Glory	8	3	3
Echo	8	2.50	3
<i>W. H. Worth & Co., Greensboro, N. C.—</i>			
Standard Ammoniated Guano	8	2.50	3
Union Acid Phosphate	14	..	..
Ocala Guano	8	2	2
Worth's XXX	8	3	3
Bone and Potash Mixture.....	10	..	2
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Standard Vegetable	8	3	3
Standard Potato	8	2	5
Standard Grain and Grass Grower.....	8	2	2
High Grade Acid Phosphate.....	14	..	..
Lawn Enricher	5	3	3
Wood's Pure Animal Bone.....(Total)	23	3	..
Bone and Potash	10	..	2
<i>Winborne Guano Co., Tyner, N. C.—</i>			
Soluble Bone and Potash.....	10	..	2
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
High Grade Excelsior Guano.....	8	2	2
High Grade Eureka	8	2	2
High Grade Triumph Guano.....	8	2	2
Winborne's 7 Per Cent Guano.....	5	7	5
King Taming Guano.....	8	3	3
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Animal Bone Meal.....(Total)	20.85	4.67	..

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

SELECTING SEED-CORN FOR LARGER YIELDS

BY

C. B. WILLIAMS



FROM FIELD-SELECTED SEED.

AUGUST, 1906

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 8.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, AUGUST, 1906.

SELECTING SEED-CORN FOR LARGER YIELDS.

BY C. B. WILLIAMS.

There is no field of work that is more inviting to the investigator or the results from which will prove of more interest and benefit to the general farmer than information concerning the proper methods of selecting seed of the different agricultural crops. By good seed alone, with present fertilization and cultivation, it is possible to greatly increase the yields of all crops grown in the State at little cost relatively. In consideration of the promise in this neglected field of work in North Carolina and that over forty-seven per cent of all land cultivated in the State is devoted to corn, with the use of something like 450,000 bushels of seed corn and a small average annual yield of less than thirteen bushels of shelled corn per acre, the State Department of Agriculture began experiments in selecting seed corn six or seven years ago, looking towards ascertaining practical information that would lead to materially increased yields of this cereal, should the facts thus worked out be taken and applied by the farmers of the State in their farming operations.

It should be borne in mind, in the beginning, that the underlying principles of plant and animal improvement are almost identical, and that similar methods to those which have been adopted in the improvement of the various breeds of live-stock must be followed by all those who wish to grow plants of increasing productiveness. It must also be remembered that as intelligent feeding and good care stand to animal breeding, so do proper fertilization and thorough cultivation of the soil stand to plant breeding or improvement; for if proper food and care are not furnished both plants and animals, improved breeding will not only be impossible, but retrogression inevitable. With the same thought and care, results are secured

much quicker with plants than with animals, as a completed growth is obtained in one year with most plants, while with animals it requires several years to secure complete knowledge of what one has obtained by a certain cross.

STARTING THE WORK.

The method that has been followed by the Department was to conduct on the large and important soil-type areas of the State compara-

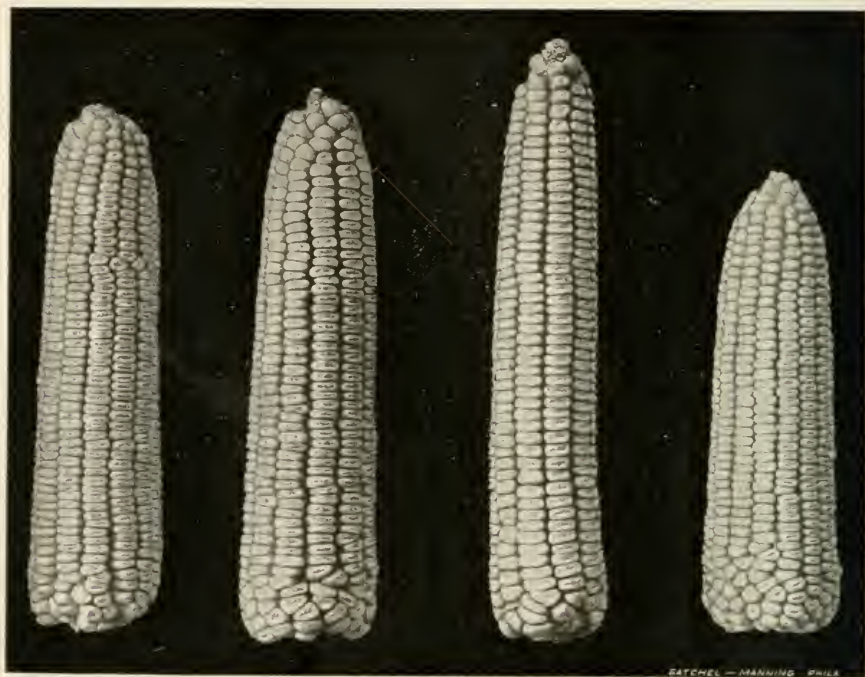


FIG. 1—Type ears of varieties: (1) Cocke's Prolific; (2) Weekley's Improved; (3) Shellem's Prolific; and (4) Biggs' Seven Ear.

tive tests of all the known varieties of promise grown and offered for sale in this and other near-by States through a sufficient number of years to secure average weather conditions.

With the variety or varieties demonstrated by these tests to be the most prolific of shelled corn per acre, field seed selection for further improvement was begun and systematically continued; having uppermost in mind, in selecting seed, total yield per acre. By this means it has been observed that the yield has been greatly increased in a comparatively short time. Largely through careful seed selection

one of the leading varieties grown in the State has been made to average, as a result of three years' tests, 5.8 bushels of shelled corn per acre more than seed of the same variety secured from a different locality and possibly selected in a different way from that which has yielded such gratifying results in the work of the Department.

TESTING VARIETIES.

The testing of varieties of all agricultural crops is of the most fundamental importance, as is evidenced by the differences in yield of different varieties grown side by side in the same field on the same type of soil with identical cultivation and fertilization, these differences being due largely to the inherent qualities of the seeds of the individual varieties which have been transmitted from parent to progeny.

During the past six years on the Test Farms of the Department something over fifty varieties of corn have been studied in comparative field tests. The number of varieties in the different tests have ranged all the way from eight in 1900 to thirty-one in 1905. The different tests of varieties at the several farms were grown as nearly under the same conditions of soil, fertilization and cultivation as it was possible to provide. To eliminate all inequalities in the character of the land, if any, the varieties at the different farms were planted each in separate rows, arranged consecutively, and this plan was repeated from three to five times, varying with the length of the rows, in order to give the desired acreage to each variety. By taking these precautions the results obtained should be reliable and highly valuable.

WHAT IS A VARIETY.

A variety is supposed to represent a class of plants with one or more distinguishing characteristics, but with a cereal like corn, which mixes so freely, variety does not mean much unless proper precautions have been exercised in its growth.

Take some variety of corn, say Cocker's Prolific, that has been bred carefully and intelligently through a number of years for high yield of shelled corn per stalk, and grow it continuously in or adjacent to a field of inferior corn, and in a very short time, especially if proper seed selection is not practiced, it will give much smaller yields, when grown under the same conditions, than the original pure-bred corn; this being due to the fact that you no longer have pure Cocker's Prolific, but a mixture of "scrub" and Cocker's Prolific corn. This fact emphasizes the importance of securing seed from reliable parties.

EARLY MATURING VARIETIES.

Iowa Silver Mine, Riley's Favorite, Leaming Yellow, Reid's Yellow Dent, and Boone County White are five of the earliest varieties in maturing that have thus far been tested on the farms of the Department. These were all originated in the northern central States, where they have been accustomed to a comparatively short growing season, which accounts largely for their inherent tendency to early maturity when grown under North Carolina conditions. Earliness,

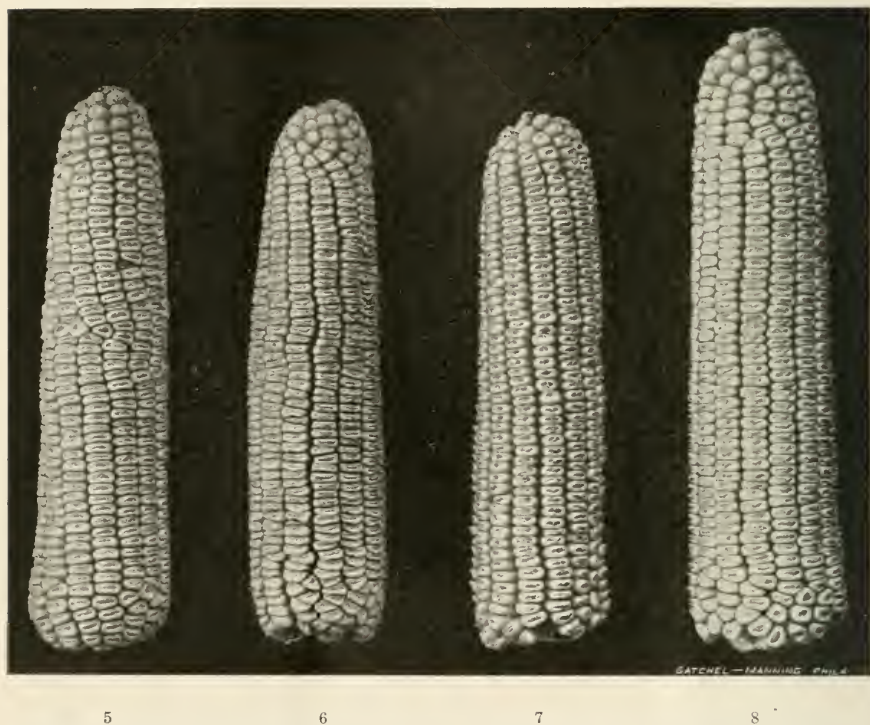


FIG. 2—Type ears of varieties: (5) Hickory King; (6) Wilson's Success; (7) Thomas' Improved; and (8) Farmers' Favorite.

however, we do not consider an important requisite with corn for this climate, except, possibly, where corn is grown in the mountainous section of the State, or where corn, of necessity, has to be planted late, after the maturity of some crop like Irish potatoes or other truck crop. Under these circumstances it may be well to use one of the varieties mentioned above, especially if experience has taught the farmer that local varieties do not thoroughly mature before frost.

MEDIUM MATURING VARIETIES.

Biggs' Prolific, Craig's Prolific White, Cocke's Prolific, and Craig's Prolific Strawberry mature at a medium date in the fall, and some of these are our most prolific varieties. All these will mature on the different types of soil of the State, if planted before July 1.

LATE MATURING VARIETIES.

It has been found that Holt's Strawberry, Sanders' Improved, Weekley's Improved and Mosby's Prolific, in the order named, are the latest maturing varieties tested during the past three years. These varieties generally produce a large and tall stalk when grown under conditions as represented by the Statesville Farm, *i. e.*, the results of the past three years' tests at that place indicate as much.

VARIETIES ADAPTED TO THE EAST.

A study of the results of the variety tests conducted at the Edgecombe Farm during the past six years indicates that the varieties of corn best suited to the fine loamy soils of the eastern and southwestern parts of the State are Cocke's Prolific, Biggs' Seven Ear, Weekley's Improved, Marlboro Prolific, Craig's Prolific Strawberry, Sanders' Improved, and Holt's Strawberry, in about the order in which they are arranged. Cocke's Prolific and Biggs' Seven Ear have proven exceedingly promising varieties. All these varieties, except Holt's Strawberry and Craig's Prolific Strawberry, are white and prolific, and produce medium to small ears.

VARIETIES ADAPTED TO PIEDMONT AND WEST.

It has been found from a testing of thirty-eight varieties during the past three years at the Iredell Farm located in the piedmont section that Weekley's Improved, Biggs' Seven Ear, Craig's Prolific White, Cocke's Prolific, Sanders' Improved, and Boone County White are the largest yielders of shelled corn per acre of all the varieties thus far tested. These, too, are all white varieties and are medium to medium-late in maturity. The best of the varieties tested at the western farm are almost the same as for the east, but the order of prolificacy is somewhat different.

METHODS OF IMPROVEMENT.

At present there are three methods in common practice for the improvement of corn by seed selection, *viz.*: (1) importation or buying of improved seed; (2) field selection of the best home-grown seed; and (3) home field selection and growing of corn for seed purposes in an isolated field.

Importation of Seed.

Under no circumstances should farmers depend each year upon importation for seed, as corn brought from a distance (where soil and climatic conditions are different) seldom yields satisfactory results until it has become thoroughly acclimated, which usually requires from two to three years. The force of this statement is amply illustrated in our experience with the best varieties of western and northwestern corn. None of these have done extra well under North Carolina conditions the first year after importation, although they

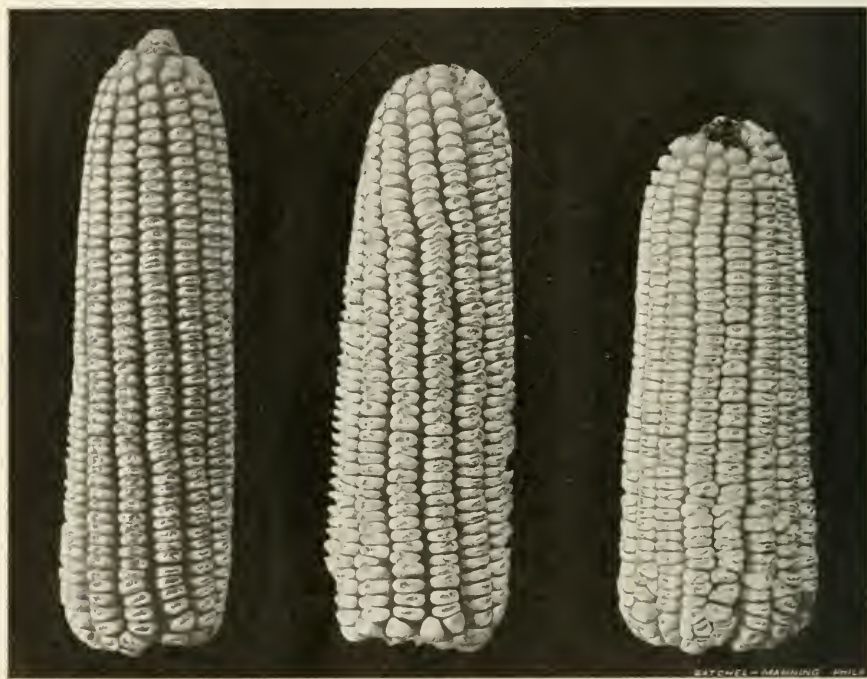


FIG. 3—Type ears of varieties: (9) Butler's Prolific; (10) Square Deal; and (11) Brake's.

are among the most prolific ones grown in the principal corn-growing belt of the country. This further emphasizes the need in all variety tests of as complete knowledge as possible of the conditions under which the parent plants were grown; especially should the locations be known from whence all seed come, before one can properly interpret varietal results, for if not acclimated, suppressed yield may be expected from this cause.

The advantage of imported seed is that the farmer is frequently enabled to begin improvement where some careful grower or skilled plant-breeder has left off. It is here as with animals; for if it is de-

sired to breed milk-cows, it is not best to go back to the "scrub" to begin selecting the desirable animals, but rather to begin with some of the best of the recognized milk breeds, like the Jersey, Guernsey, etc., and with these continue the improvement by breeding and selection.

Buying Seed.

In buying seed, farmers should require the dealers to ship the corn on the ear, and supply a statement as to where the seed were grown. This is essential, for as pointed out above, if the corn were grown under greatly different soil and climatic conditions the seed would seldom prove satisfactory, although they might be of good quality and from an excellent variety. Another advantage of buying seed on the ear is that when it comes if it is not satisfactory it may be returned to the shipper; or if only a few ears are unsatisfactory they can easily be thrown out before shelling. It is best in shelling seed corn that each ear should be shelled separately before putting with others, so that ears with undesirable characteristics may most easily be discarded.

It is not always cheapest to buy the seed corn that can be purchased for the least money. In Department tests, as great differences as ten bushels of shelled corn per acre excess over the best varieties of our native corn have frequently been found. Now, placing native corn, selected in the usual way, at sixty cents, and the best field-selected varieties at one dollar and fifty cents per bushel, and assuming a bushel of corn will plant six acres, it will make the seed of land planted in native corn cost ten cents, while that planted from seed of the best varieties cost twenty-five cents per acre. Now deducting the difference in cost of seed, which is fifteen cents, we have a gain in favor of the planting of seed of the most prolific varieties of \$5.85 per acre.

On the other hand, because a variety is advertised in extravagant superlatives and quoted at an advanced price, it is not always a guarantee of its worth. Hence the best method to pursue in purchasing seed corn is to buy only from the most reliable seedsmen and have it shipped on the cob, so as to enable the buyer to see just what he is getting. This precaution is advised because it is a well-established fact that many seedsmen buy whole surplus crops of corn and without a particle of selection, other than removing rotten ears, shell and screen it and place it upon the market, after thoroughly advertising it, at a price many times the market price of ordinary corn, and often it is no better—and sometimes decidedly inferior.

Field Selection of Seed.

The proper place to select seed corn is in the field at or just before gathering time, and select from stalks that have more than one good developed ear per stalk, as such seed will tend to produce an increased yield in the next year's crop. Ears of medium length and size are preferable to the long and large ones, because the latter were gener-

ally either produced on stalks that bore but one ear or else on stalks that grew on some fertile spot in the field, either of which seed does not tend to promote the greatest yields when planted. Corn grown on average land will do better planted on land of medium fertility than when corn grown on rich land is used, for the same reason that stock accustomed to poor conditions will do better on an inferior pasture than stock accustomed to more favorable surroundings.

The selection should not be turned over to the hired man, but should receive the best efforts of the farmer himself, as it is sure



FIG. 4—Poor and well-shaped ears: (1) Well-shaped ear; (2), (3) and (4) are all undesirable ears for seed purposes.

that time expended in this work will prove as profitable, if not more so, than any other work done on the farm. By continually selecting and planting corn possessing certain desirable characteristics, such as production of two good ears per stalk, it will be found as the selection goes on from year to year that these desirable qualities have each year become more thoroughly fixed.

It should be constantly kept in mind that on every farm changes beneficial or detrimental are continually taking place, as it is an inherent tendency of all plants to vary more or less and retrograde or “revert” to a less productive state if intelligent and rigid selection is not persistently kept up.

In making selections in the field, at least four times as much corn should be gathered as it is desired for seed purposes the following year, so that further and more careful selection can be made, after the ears have been taken to the barn, and when a leisure time presents itself. In the final selection, the ears should be arranged conveniently on the barn floor or ground, and with an ear of the type desired in mind, or in hand, go over the lot and remove all undesirable ears. The seed thus selected should be transferred to a box or barrel and covered with wire gauze or something else that will permit of thorough ventilation and keep out rats and mice. Store the barrel or box in some dry place and let remain until the seed are wanted for planting.

Barn Selection.

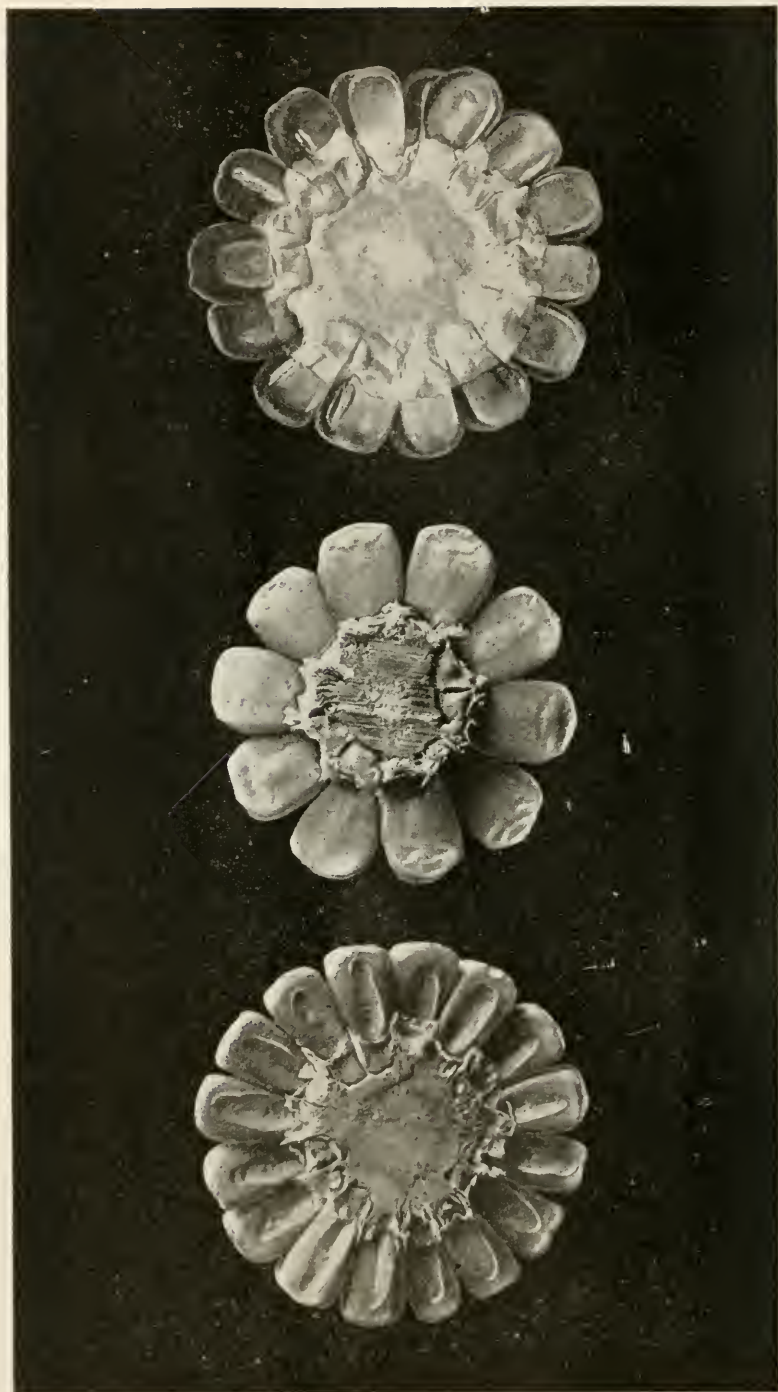
It is a common and almost universal practice in North Carolina to make seed corn selection, where it is made at all, from the crib in the spring just before planting time, when the quantity is small and the quality inferior. This method yields better results than no selection at all, but is far inferior to field selection, where the performance record of each stalk is given consideration.

In barn selection, it is usually the larger ears that are chosen for seed purposes, and these are not, as pointed out above, the best ones for seed. We have in this State, by our barn method of seed-corn selection, been unconsciously selecting, growing and perpetuating one-eared types of corn.

Result of Proper Seed Selection.

By careful seed selection, the yield for North Carolina could easily be increased two bushels of shelled corn per acre, which would be worth about three and one-fourth million dollars per year clear to the farmers of the State when corn is selling for sixty cents per bushel. By adding one grain per ear to the present yield through use of better methods of seed selection, over \$70,000 increase annually would result in net receipts for the corn crop of the State. These are exceedingly low estimates of what might be done by proper seed selection, for the Department and workers in other States have found that from five to fifteen bushels of shelled corn more are yielded per acre from well-selected seed than from those selected in the usual way.

In experiments with this cereal conducted on the Eastern Test Farm during the past six years, it has been found that varieties of corn that were planted side by side in the same way on the same type of land and fertilized and cultivated identically, as far as was possible to do, have varied from 6.2 bushels in 1900 to 13.6 bushels in 1905.



1

2

3

FIG. 5--Types of cobs: (1) good shape; (2) too small cob and distance between rows of kernels too wide; (3) too large cob and kernels too round and shallow.

Field Selection and Growth of Seed in an Isolated Field.

By carefully selecting a limited number of the very best obtainable seed ears from the field in the fall and planting them in a field separated from any other corn, something like 500 or 600 yards, to prevent crossing by the pollen being carried by the wind, much better and quicker results are secured than where simple field selection alone is practiced, *i. e.*, if the breeding plat or field is properly cared for. This field should be tolerably fertile (equal at least to the lands on which the general crop is to be grown), for poverty of soil is very conducive to reversion, thereby losing in one year's growth on a poor soil what has been gained by a number of years of rigid selection. The rows in the breeding plat should be of such length that they will require only about three-quarters of an ear per row, and in planting, each row should receive its individual ear, so that the performance record of each seed ear can be seen, and if not satisfactory the whole row can be rejected for seed purposes. After planting as many rows as is desired from the selected ears, a composite sample should then be made of the quantity of each ear left over, and a border of several rows planted entirely around the breeding plat to still further prevent the possibility of wind pollination from outside corn-fields. The land on which this plat is to be located should be given deep and thorough preparation. The subsequent cultivations of the corn should be every ten to twelve days, with a cultivator with small hoes on, rather deep early in the season, but becoming shallower and with the larger hoes on as the season advances and the root system extends towards the middle of the row and nearer the surface. Especially is this important on upland soil, where conservation of all moisture plays such an important part in yield. When the corn in the breeding plat has attained to the tasseling stage, the tassels from all barren stalks should be carefully removed just as they are emerging from the roll of the last leaf. The tassel is the male part of the corn plant, while the silk is the female part. When a stalk is barren or bears only male organs, the tassel is frequently above the average in size, strength, and vigor, as all the vital forces of such a plant have been expended on this single organ of reproduction; hence, when an ovule or embryonic kernel, through the silk, is fertilized or pollinated by the yellow dust-like pollen from a barren stalk, it will, when planted, have a strong tendency, inherited through its male parent, to produce a barren stalk. The tassels should also be removed from all weak and stunted plants; for the same reason we would not use a "scrubby" stunted bull in a herd of cows if we cared anything for the future improvement of the stock. It has been demonstrated time and again by carefully conducted experiments that by selection from poor plants the yield of corn will not only be materially reduced, but will be of inferior quality. The writer has, during the past four or five summers, visited quite a num-

ber of corn-fields in different parts of the State and has found but few fields that contained less than 10 per cent of barren stalks, which means that from every ten acres in cultivation a loss of one acre's yield from non-productive stalks is generally sustained. In one field in which a count was made it was found that from 40 to 50 per cent of the stalks were barren, although this corn possessed a luxurious growth and had attained an average height of something like 10 to 12 feet. It must not be overlooked that the secret in successful corn raising consists in having a good stand and in having each stalk bear at



FIG. 6—Type kernels of varieties: (1) Cocke's Prolific; (2) Weekley's Improved; (3) Shellem's Prolific; (4) Biggs' Seven Ear; (5) Hickory King; (6) Wilson's Success; (7) Thomas' Improved; (8) Farmers' Favorite; (9) Butler's Prolific; (10) Square Deal; and (11) Brake's.

least one or two good-sized ears, as it costs just as much to cultivate non-productive stalks or land without stalks as it does prolific ones and a good stand. The number of barren stalks in our fields should not, under average conditions of weather and cultivation, ever reach over 3 to 5 per cent.

CHARACTERISTICS TO CONSIDER IN SEED SELECTION.

As total yield of shelled corn per stalk is the principal consideration in the production of corn, the following characteristics correlated

with large yield will be taken up somewhat in detail for consideration:

Number of Ears per Stalk.

In variety tests on the Test Farms of the Department during the past six years, it has been found to be a pretty general rule that those varieties yielding the greatest number of bushels of shelled corn per acre were usually those that possessed a decidedly strong tendency to produce more than one ear per stalk. Notwithstanding these striking and pretty uniform results, because of the claim made by some that if distance is given the better one-eared varieties they would produce larger yields than the prolific ones, comparative tests were, in the spring of 1905, put out on the Edgecombe and Iredell farms with one large-eared and two prolific varieties. For the tests, Holt's Strawberry, one of the best one-eared varieties grown in the State, was compared with Cocke's Prolific and Weekley's Improved. The latter two varieties gave larger yields than Holt's Strawberry at both the farms and at all the different distancing of the hills in four-foot rows that were tried. At the eastern farm, Cocke's Prolific produced the following increase of bushels of shelled corn over Holt's Strawberry: At 20 inches, 9.6; at 24 inches, 12.1; at 30 inches, 14.0; at 36 inches, 3.9; and at 40 inches, 4.0 bushels; while at the western farm the increased yields were 11.7, 3.4, 6.2, 9.9 and 3.0 bushels per acre at the respective distances.

Weekley's Improved increased yields over Holt's Strawberry were, at Edgecombe: 10.8 bushels at 20 inches, 9.2 at 24 inches, 16.4 at 30 inches, 15.6 at 36 inches, and 9.0 at 40 inches; while at Iredell the increases were 5.9, 6.7, 8.6, 9.9 and 1.0 bushels, respectively.

In the light of these results, coupled with six years' observation in variety testing, it is quite evident that the largest yields on any type of soil is going to generally result from the growth of the more prolific varieties, because they produce more shelled corn per stalk, and as the stalks are generally smaller and can be planted closer in the rows, will have more stalks per acre without crowding.

When corn is planted wide apart in the row and in wide-apart rows—matters not if the best one-eared varieties are used—the land will not be able to produce the maximum yield it is capable of producing, for the simple reason that there is not a sufficient number of stalks standing on an acre.

Cocke's Prolific and Weekley's Improved, at both the Edgecombe and Iredell farms, produced their largest yields last year at the distancing centering about 30 to 36 inches between the hills in four-foot rows; while Holt's Strawberry did its best at the greatest distancing tried—40 inches between the hills. At its most favorable distancing, at both the farms, Holt's Strawberry yielded less by 12.6 and 4.2 bushels of shelled corn per acre respectively, than Cocke's Prolific at the distancing best suited to it. Weekley's Improved,

with its optimum distancing at Edgecombe, yielded 13 bushels more than Holt's Strawberry at 40 inches; while at the Iredell Farm Weekley's Improved, with the stalks spaced 36 inches in the row, produced 4.2 bushels per acre in excess of Holt's Strawberry at its most favorable distancing.

Which of Two Ears on Stalks to Select for Seed.

In the selection of seed corn from stalks bearing two or more ears per stalk, the selections should be made from those stalks that have



FIG. 7—Type kernels of varieties: (1) Holt's Strawberry; (2) Mosby's Prolific; (3) Sanders' Improved; (4) Southern Beauty; (5) Eureka; (6) Hastings' Prolific; (7) Selection 77; (8) Iowa Silver Mine; (9) Boone County White; (10) Reid's Yellow Dent; (11) Riley's Favorite; and (12) Leaming Yellow.

the ears of a uniformly convenient height for gathering and of those ears on the stalks that possess the greatest number of desirable characteristics. Most investigators in this country who have made careful field tests and kept accurate records with this cereal are pretty uniformly of the opinion that the top ear, being usually the best shaped and matured, is the one, as a general rule, to be preferred for seed purposes. However, with present knowledge on the subject it will be well to select for seed all the ears on stalks bearing two ears per stalk, if the ears are well shaped and thoroughly ma-

tured, and possess kernels of proper shape, color and vitality. It must be kept in mind that if it is wished to produce a variety that will bear more than one ear per stalk, selection should be made in the field each fall from stalks bearing two or more ears per stalk. What is meant by a two-eared variety of corn is, or should be, that when it is grown under the same conditions as some other variety, such as Holt's Strawberry, it will have more stalks bearing two ears than Holt's Strawberry, a one-eared variety. Of course, other factors besides seed selection play an important part in determining the yield of any variety of corn. They are fertility and physical condition of the soil, season, cultivation, etc. Notwithstanding these facts, some seedsmen advertise that they have certain varieties of corn that will bear two, three, four, five and even six and seven ears, as the case may be, per stalk, implying, if not stating positively, that the exploited varieties with euphonious and "catchy" names will do these wonderful and impossible things regardless of poverty of the soil and unfavorable soil and seasonal conditions. It is often wise to let your neighbor do the buying from the man that claims too much, and do your own purchasing from one that claims less and supplies seed that do more.

Large versus Small Ears.

Although, taking everything into consideration where corn is gathered by hand in the ordinary way, it will usually be a little easier and slightly cheaper to gather and handle the same acreage of large-eared corn than of corn with smaller ears, when the yield of shelled corn per acre for both are the same; yet, quite frequently from a financial standpoint, it will be better for the farmer to use seed of a variety possessing a relatively small ear, because of the greatly increased yield of grain per acre that would result from the use of such seed. Within reasonable limits, it should not be so much the size of the ears that should govern in the selection of a variety for seed purposes as the persistency of the seed of the variety to withstand adverse conditions and to produce large yields of shelled corn per stalk and hence per acre. However, in selecting within the same variety, it will usually be advisable to choose for seed those ears, other characteristics being equal, that are of the average or slightly above the average in size for the variety.

The size of the ear of a variety is not determined solely by heredity, but is greatly influenced by season, soil, fertilization, cultivation, etc.: for the more favorable these conditions are for the growth of the plants, the larger will the ears produced be at maturity, and the more unfavorable these conditions are the smaller they will grow. In other words, if seed of the same variety were planted during the same year on both rich bottom and ordinary upland soils it would be found at maturity, with a favorable season, that the corn

grown in the bottom had not only produced a larger yield and greater number of ears per stalk, but had also borne considerably larger ears, and it would generally be easy for one who is at all familiar with ear-types of different varieties to determine by general appearances whether a given ear had been produced on rich land or not.

It will be better to use seed of a variety having medium small ears with poorly-shaped kernels in preference to one with large well-shaped ears possessing well-formed kernels, if the former produces, under the same conditions of season, soil, and cultivation, greatly increased yields over the latter, notwithstanding the fact that it may



FIG. 8—Poor and well-shaped kernels.

be a little less expensive to house the latter; because the net profit resulting from the former would be much greater.

By using a variety with a strongly fixed prepotency to high yields of shell corn per stalk, the great desideratum after all, the size and shape of the ear and its kernels may be materially improved in a few

years through careful selection with a resulting tendency to further increased yields over the original stock. It should be borne in mind clearly, however, that by developing better shaped ears and kernels of any variety, through seed selection persistently practiced through a number of years, that only two of the many characters that contribute to high yields are improved. The greatest underlying cause of high yields, outside of environment, is a reasonable prolificacy; and under the present average conditions of soil, fertilization, etc., that obtain in this State, it is extremely doubtful if selection for a yield greater than two ears per stalk is at all advisable. If too great prolificacy is induced, it is quite likely to prove a decided disadvantage when such corn is planted on poor land.

Stalks.

The kind of stalk from which to make selections is one free from suckers and possessing a tolerably large circumference at the base and gradually tapering towards the top, as this is the type that stands drought best and is not as apt to be blown down as a high, slender one. In selection, weight should be attached to good root and leaf development of the mother parent, as all nourishment and growth are largely dependent upon the thoroughness with which these two organs do their work. Poor root or leaf development is indicative of meager growth and small, poorly-developed production. All selections should be made from perfectly healthy plants.

Ears.

In selecting seed corn, care should be given to the following characteristics of the ear: Position on stalk, kind of shank, shape and color of grain and cob, size of cob, filling out of butts and tips, number of and distance between rows of kernels, and length and circumference.

Position on Stalk.—If all ears in a field are of approximately uniform height there is greater probability of complete fertilization of all the grains of the ears than would be the case if some of the ears were high up on the stalks, while others were comparatively near the ground. An extremely high ear tends to late maturity, while one very near the ground tends to ripen extra early; hence, the stalks on which such ears are borne will not make, as a general rule, a very large growth. For the ears in a field to be completely fertilized or pollinated, the silks of the ears should be ready to receive the falling grains (dust-like particles) from the tassels as soon as they are given off and disseminated by the wind. On the same plant, the silks usually make their appearance from 4 to 5 days after the tassel.

The position of ear on stalk should be at a medium height, for two reasons: (1) because the stalk will be less liable to be blown down,

as the ear will have less leverage, thereby averting the injury caused by lying on the ground; and (2) because if at a convenient height it can be gathered with a great deal more ease and at considerable less expense, because the work can be done more rapidly.

Shank.—This should be of sufficient size and strength to hold the ear well and in a rather drooping position, so that rain will be shed and hence prevented from running into the ear and causing the grain to rot, as would often be the case if the ear were held in an upright



FIG. 9—Well-shaped kernel possessing a large, strong, healthy germ.

position, especially if the end of the ear was not covered well by shuck.

Shape.—The cylindrical ear (Fig. 4—1) is the best type, as it is the one that generally yields the highest percentage and the largest total amount of shelled corn. The rows of kernels should run parallel the full length of the cob without change in shape or diminution in size, or if so, but very slightly. If the ears are tapering towards the tip there is a suppression of yield, due to one or both of two

causes, viz.: (1) diminished size of kernels at the tips, and (2) dropping of rows of kernels an inch or so from the tip end.

Color.—Yellow corn should have a deep-red cob, while white corn should possess a white one, and any variation from these types is indicative of crossing of varieties. The market price of meal or grits made from white corn with red cobs is lower because of particles of the red cobs getting into the corn and being ground in with meal, giving it a reddish and unattractive cast.

Size of Cob.—A medium-sized cob is the best, because it usually yields the largest proportion of corn to cob. If the cob is small, of necessity the number of grain rows is restricted, and when large the proportion of corn to cob is reduced. The best size cob is shown in Fig. 5—1, Fig. 5—3 is too large, while Fig. 5—2 is too small.

Length and Circumference.—The length to circumference should be about as 4 to 3, *i. e.*, if the ear is 8 inches long its circumference should be approximately 6 inches, when measured about one-third the way from the butt to the tip, to produce the largest yield. Too large circumference usually indicates small narrow kernels of low vitality and poor feeding value.

Filling-out of Butts and Tips.—The more perfectly ears are filled at butts and tips, the larger the percentage yield of corn. It is possible, by rigid selection of ears filled compactly at butts and tips, to increase materially within a few years the annual yield over corn in which no consideration is given to these characteristics. In Fig. 4 is shown poorly and well-tipped ears.

Number of and Distance Between Rows of Kernels.—The number of rows to the ear should be comparatively large and the distance between them very small to secure the highest percentage yields. A wide *sulcus*, or distance between rows, indicates a reversion to an inferior type that will not justify the farmer of to-day in growing. In Fig 4 is strikingly shown the difference in the solid setting of corn on (1) and (2). In (1) there is little or no space between the rows, while in (2) there is considerable.

Kernels.

The corn kernel may be divided into four parts: (a) the hull or outer layer; (b) the hard, flinty portion next to the hull and lying principally at the sides; (c) the white, floury portion occupying the crown; and (d) the germ or chit, which is situated on the side of the kernel, facing the tip of the ear. The hard, horny portion contains the larger proportion of the protein (flesh-forming material), while the white, floury part of the crown is rich in carbohydrates (which is the fattening and heat-producing portion of the grain, mainly starch), and the germ carries a greater part of the oil and is also rich in protein. In making seed selections for high percentage yields, the kernels should be of a medium wedge shape, but not too long and sharp,

for such a form not only "wastes space at the cob and restricts the size of the germ," but indicates inferior quality and low vitality. The wedge-shaped kernel is the one that fills more compactly than any other the space between the grain rows.

In Fig. 8 is shown good and bad forms of kernels. Kernels 1 and 12 are the best forms, while all the others are more or less poor. Also in Fig. 9 is a proper-shaped kernel, photographed about four times natural size. Its arrangement is shown on cob, Fig. 5—1.

VITALITY OF SEED.

The vitality of any seed is largely governed by their stage of maturity when gathered, by vigor of the parent plant, and by the care used in curing and storing them after harvest. As a general rule, with some varieties the larger the seed, not only of corn, but all crops, the larger the amount of reserve plant-food and the higher the percentage of germination, and hence, the better the stand; and low germination resulting in a poor stand is often one of the most potent causes for small yields. Large plump seed are generally grown on strong, healthy plants. If possible, the seed corn should be gotten together and its germination thoroughly tested before planting time arrives. This can be done, after "nubbing" the corn, by taking three or four grains from different portions of the ears, putting them in moist sand in a plate, box, or some other receptacle and placing in a warm place. The space in which the seed from each ear are placed should be marked in some way to correspond with the ear from which they were taken, and should be kept moist all the time, but not soaking wet. All the seed corn might be tested in this way with profit, and all those ears that showed a germination less than ninety per cent should be discarded. If the farmer cannot do this work himself, then he might interest his boys in it and let them do it. They will in all probability take great interest in this work, which may be done at night if necessary. This precaution is highly important, for, as a general rule, replants never amount to much.

"NUBBING" EARS.

Carefully conducted experiments have demonstrated that it is advisable to "nub" corn before planting, for it has been found that when seed from the tips and butts of ears are placed in one plat and by the side of it another plat is planted in kernels from the centers of the same ears, that there is a larger percentage of dwarfed and barren stalks on the plat planted in tip and butt kernels than from the other, and hence less yield of shelled corn per acre. As both plats were planted on the same type of soil and treated in the same way by fertilization and cultivation, it is strongly probable that the

decreased yield of the plat sown in butt and tip grains was due to the seed, as all other conditions were as nearly identical for both as it was possible to secure.

WHITE VERSUS YELLOW CORNS.

The Department in its experiments, has gotten higher yields of shelled corn per acre from the white than from the yellow varieties of corn. This greater yield may be due to the fact that the Southern people, being partial, as a general rule, to white corns, have improved them more than they have the yellow varieties. From the standpoint of chemical composition, the yellow corns are no richer in feeding value than the white ones, which fact is contrary to a common belief prevalent in this and other States. The only difference in the two is that there is a small amount of coloring matter present in the kernels of the yellow corn which is not found in the kernels of white varieties.

RELATION OF CHARACTERS.

One of the purposes of the detailed study of varieties of corn by the Department has been to ascertain what characters of this cereal, being mutually helpful, and hence conducive to higher yields, may be expected to be found combined in the same plant or group (varieties) of plants, and what ones, being generally antagonistic to each other, seldom or never occur in the same plant or group of plants. This knowledge is highly essential in the development and improvement of corn as well as all other agricultural crops. For if one is familiar with these fundamental facts he will be better enabled to originate, improve and select varieties best suited to his local conditions and purposes in the least-period of time and with a minimum of disappointments. As an average of the results of the past three years' work, supplemented by field observations, the tentative general inferences that follow are made with reference to the varieties of corn studied when grown under conditions of soil and climate as represented by North Carolina.

Antagonistic Characters.

(1) Earliness in maturity, other things being equal, does not generally tend to large yields of grain and stover, nor to high stalks and ears. (2) Large-eared varieties usually have a relatively low percentage of grain to cob and are as a rule less productive of shelled corn per acre, when grown under our conditions. (3) Ears with very small cobs have poorly-shaped kernels as a rule and give a small amount of shelled corn per ear, and *vice versa*. (4) Kernels of low vitality do not tend to the growth of plants of maximum yields.

Associated Characters.

(1) Earliness, other things being equal, usually tends to high percentage of ear to stover and conversely, although this ratio is more or less modified by season, soil, fertilization, breeding, and selection. (2) Varieties producing two ears per stalk are generally more productive of shelled corn per acre than those bearing only one ear per stalk, although it may be a large one. (3) Medium maturing varieties, in our experiments, have been the ones, generally, to give the largest yields per acre of shelled corn. (4) Small kernels usually possess low vitality and those kernels with small germs contain a small percentage of fat or oil and reduced feeding value, especially for fattening animals. (5) Varieties with good root and leaf development are usually the most resistant ones to drought, and insect and disease ravages.

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

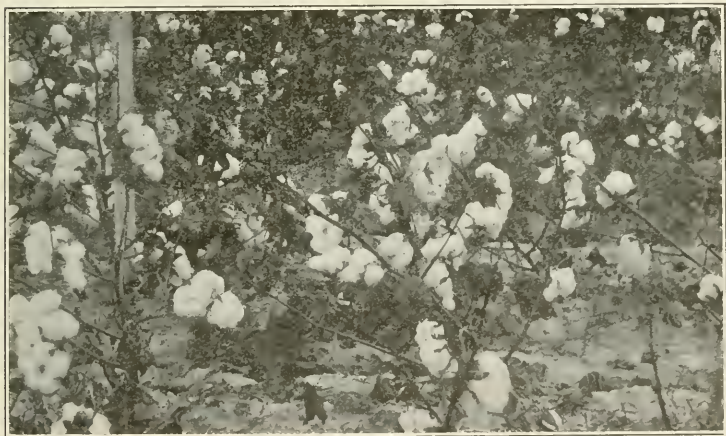
COTTON PLANT.

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Proportion and Composition of Different Parts. Effect of Variety, Selection and Environment upon Yield, Maturity, Proportion of Parts and Percentage, Length and Diameter of the Fiber. Varietal Differences and Adaptations.

BY

C. B. WILLIAMS



GROWN FROM FIELD-SELECTED SEED—EDGEcombe TEST FARM.

SEPTEMBER, 1906

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 9.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, SEPTEMBER, 1906.

COTTON PLANT.

BY C. B. WILLIAMS.

This plant has been known of and highly valued from time immemorial. In India, China, and in Egypt and other parts of Africa it was grown and its fiber constructed into fabrics prior to the advent of the Christian era. It was found growing in the West Indies by Columbus and in Mexico by Cortez. From the ancient tombs of the Incas of Peru articles of cotton cloth have been removed. With all this antiquity of the cotton plant, its introduction into the United States was not until the beginning of the third decade of the eighteenth century, when it was first grown in Virginia. Here and in the Carolinas its growth was confined principally until the latter part of the century, when, through the inventions of improved spinning-machinery by Hargraves, Cartwright and Crompton, and later, the invention of the power-loom by Cartwright and the cotton-gin by Whitney, its growth was greatly stimulated and extended, until to-day ten of the Southern States of the Union produce about four-fifths of the world's supply of raw cotton, which sells annually for something like \$500,000,000 to \$700,000,000. On two-thirds to three-quarters of the farms in six of these States cotton is the principal source of income, and in the United States, although only covering one-twelfth of the acreage under cultivation and producing less than two-fifths of a bale per acre, it comprises about one-eighth of the total value of all crops grown.

In North Carolina almost one-fifth of all cultivated land is given over to the growth of cotton, the products from which sell for about one-third of the total price brought by all crops.

Now, in consideration of these very significant facts, space will be given to a study, in a brief way, of the plant that produces this crop for which our State and the entire Southland is pre-eminently noted and distinctively adapted, and on which it is so largely dependent as a source of revenue; devoting especial attention to the effects of environment, requirements of growth, and to the composition, structure, relation, etc., of its different parts and their utility and economic importance, with the hope of throwing some little light

upon the problems involved in stimulating increased yields and more intelligent utilization, as well as inducing further work along those lines which are especially promising and important:

ENTIRE PLANT.

Proportion of Parts.—In giving the composition of the entire plant, it should be remembered that season, soil, seed, fertilization, cultivation, etc., are each potent factors influencing, within comparatively narrow limits, the proportion of the different parts of a normal mature plant; yet, as an average of a large number of weigh-

TABLE I—COMPOSITION OF DIFFERENT PARTS OF THE COTTON PLANT AND THE LINT ON THE BASIS OF YIELD OF CULPEPPER'S IMPROVED

Laboratory Number (F Series).	Part of Plant.	Fertilizer Application per Acre. ¹	Fertilizer Formula.	Percentage	
				Moisture.	Ash.
1	Cotton leaves-----	{ 150.3 pounds acid phosphate----- 157.8 pounds kainit----- 141.2 pounds cotton-seed meal----- }	NPK ₃	9.36	13.52
5	Cotton leaves-----	Nothing-----	O	8.91	16.63
9	Cotton leaves-----	{ 100.9 pounds acid phosphate----- 13.0 pounds kainit----- 423.6 pounds cotton-seed meal----- }	N ₃ PK	8.56	17.61
13	Cotton leaves-----	{ 150.3 pounds acid phosphate----- 52.6 pounds kainit----- 141.2 pounds cotton-seed meal----- }	NPK	8.01	-----
17	Cotton leaves-----	{ 450.9 pounds acid phosphate----- 52.6 pounds kainit----- 141.2 pounds cotton-seed meal----- }	NP ₃ K	9.31	15.19
2	Whole cotton seed ² -----	Same as No. 1-----	NPK ₃	7.11	3.63
6	Whole cotton seed ² -----	Nothing-----	O	7.51	4.58
10	Whole cotton seed ² -----	Same as No. 9-----	N ₃ PK	6.48	4.15
14	Whole cotton seed ² -----	Same as No. 13-----	NPK	7.01	4.31
18	Whole cotton seed ² -----	Same as No. 17-----	NP ₃ K	7.40	3.95
3	Cotton stems, roots, bolls, limbs, etc.-----	Same as No. 1-----	NPK ₃	7.85	4.66
7	Cotton stems, roots, bolls, limbs, etc.-----	Nothing-----	O	7.17	7.20
11	Cotton stems, roots, bolls, limbs, etc.-----	Same as No. 9-----	N ₃ PK	7.48	4.56
15	Cotton stems, roots, bolls, limbs, etc.-----	Same as No. 13-----	NPK	8.56	4.41
19	Cotton stems, roots, bolls, limbs, etc.-----	Same as No. 17-----	NP ₃ K	9.08	5.11
4	Cotton lint ³ -----	Same as No. 1-----	NPK ₃	4.81	1.88
8	Cotton lint ³ -----	Nothing-----	O	4.30	1.25
12	Cotton lint ³ -----	Same as No. 9-----	N ₃ PK	4.39	1.67
16	Cotton lint ³ -----	Same as No. 13-----	NPK	5.02	1.54
20	Cotton lint ³ -----	Same as No. 17-----	NP ₃ K	5.37	1.47

¹Normal (NPK) application in these experiments is equivalent to 400 pounds of a fertilizing mixture, analyzing 7 per cent available phosphoric acid, 2½ per cent nitrogen, and 2½ per cent potash.

²All determinations were made in duplicate, but only averages are given below.

ings made under widely varying conditions, it may be stated that this plant is composed, approximately, of $20\frac{1}{4}$ per cent of leaves, 23 per cent of seed, $10\frac{1}{2}$ per cent of lint, and $46\frac{1}{4}$ per cent of stem, limbs, bolls, and roots combined.

Composition.—As the result of quite a number of analyses, made in the Chemical Laboratory of the State Department of Agriculture, of entire cotton plants of the crop of 1901, and taken from the experimental grounds of the Edgecombe Test farm, it was found that the different parts of the plant on plats fertilized differently contained, respectively, the percentages of fertilizing constituents given in the following table:

QUALITY OF FERTILIZING CONSTITUENTS REMOVED PER ACRE BY THE SEED VARIETY IN 1901 AT THE EDGECOMBE TEST FARM.

Composition on Air-dried Sample ² .					Percentage Composition on Dry Basis.				Amount in Pounds of Each Constituent in Different Parts of Crop per Acre.				
Phosphoric Acid, (P ₂ O ₅).	Potash, (K ₂ O).	Nitrogen, (N).	Lime, (CaO).	Ash.	Phosphoric Acid, (P ₂ O ₅).	Potash, (K ₂ O).	Nitrogen, (N).	Lime, (CaO).	Ash.	Phosphoric Acid, (P ₂ O ₅).	Potash, (K ₂ O).	Nitrogen, (N).	Lime, (CaO).
.42	.34	1.35	3.22	14.92	.46	.37	1.49	3.55	-----				
.55	.53	1.50	3.20	18.26	.60	.58	1.65	3.51	-----				
.43	.35	1.38	3.08	19.26	.47	.38	1.51	3.36	-----				
.42	.50	1.21	3.13	-----	.46	.55	1.32	3.40	-----				
.36	.22	1.19	2.78	16.75	.40	.24	1.31	3.06	-----				
1.21	1.28	3.05	.13	3.91	1.30	1.38	3.28	.14	18.11	6.02	6.39	15.19	.65
1.60	1.22	2.62	.11	4.95	1.73	1.31	2.83	.12	12.35	4.32	3.27	7.06	.30
1.37	1.33	3.07	.13	4.44	1.46	1.43	3.28	.14	34.82	11.45	11.22	25.73	1.10
1.35	1.25	2.46	.11	4.63	1.45	1.34	2.64	.11	21.74	6.81	6.29	12.40	.52
1.18	1.16	2.65	.14	4.27	1.27	1.25	2.86	.15	25.06	7.45	7.34	16.79	.88
.24	1.88	.60	.46	5.06	.26	2.03	.65	.50	-----				
.41	2.40	.68	.49	7.76	.44	2.58	.73	.52	-----				
.29	1.23	.61	.50	4.93	.31	1.33	.66	.54	-----				
.25	1.66	.48	.51	4.82	.27	1.81	.52	.55	-----				
.21	1.43	.64	.53	5.62	.23	1.57	.70	.58	-----				
.14	.80	.37	.20	1.97	.15	.84	.39	.20	4.86	.37	2.07	.96	.49
.10	.59	.23	.21	1.31	.10	.62	.24	.21	1.74	.13	.82	.32	.28
.09	.62	.27	.16	1.75	.09	.65	.28	.17	7.32	.38	2.72	1.17	.71
.10	.58	.30	.19	1.62	.11	.61	.32	.20	4.06	.28	1.53	.80	.50
.11	.53	.25	.15	1.55	.12	.56	.26	.16	4.85	.38	1.75	.81	.50

²As the separations of seed and lint were not made in 1901, it is assumed to be the same as the average of the separations of 1900, 1902 and 1903, and this average is used in calculating the results recorded in the last five columns of this table. Culpepper's Improved was the variety used in this work.

Ash.

By a glance at Table I it is readily seen that the percentage of ash in different parts of a mature cotton plant is quite wide, and somewhat variable in the same part under different fertilizer treatments. It has also been demonstrated that the amount of ash present in any part of the plant will be governed, to a limited extent, by stage of growth, soil, etc. The largest percentages have been found in the leaves, the manufactory of the plant, and the smallest in the lint, one of their manufactured products.

Reporting the average results, calculated to a dry basis, the ash was found distributed as follows: 17.30 per cent in the leaves, 4.44 per cent in the seed, 1.64 per cent in the lint, and 5.64 per cent in the stem, limbs, bolls, and roots taken together. It is very significant that those parts of the plant, such as leaves, stem, roots, etc., which are high in inorganic materials, are the ones that are left in the field to be returned to the soil, while lint and seed, the products usually removed, are the lowest, in the aggregate, in those materials that were originally derived from the soil.

Phosphoric Acid.

Phosphoric acid, which is so highly essential for the nutrition and proper functioning of the nuclei of the growing cells of the plant, is found stored, as would naturally be expected, in largest quantities proportionally in the seed, where it can be used by the young growing plants before they are able to secure this constituent from the medium in which the seed are germinating. The average percentage of phosphoric acid, on dry basis, in the different parts of the plant are: leaves, .48 per cent; seed, 1.44 per cent; lint, .11 per cent; and other parts of the plant combined, .30 per cent. Strange as it may seem, the largest percentage of this constituent was found in the leaves, seed, and stems, bolls, roots, etc., of plants unfertilized, while those receiving the fertilizer mixture highest in phosphoric acid contained this constituent in the different parts of the plant in the smallest percentages.

Potash.

In the case of potash, as with phosphoric acid, with the exception of the seed, the largest percentage in all parts of the plant was present in those plants grown on unfertilized plats and the smallest in the different parts of plants that were fertilized with a mixture of 450.9 pounds of acid phosphate, 52.6 pounds of kainit, and 141.2 pounds of cotton-seed meal per acre, which mixture contains triple the quantity of phosphoric acid possessed by any of the other fertilizing mixtures used. As an average of all the analyses of the different parts of plants fertilized differently, potash was found distributed

in the mature plant (dry) as follows: leaves, .42 per cent; seed, 1.34 per cent; lint, .66 per cent; and stem, roots, etc., combined, 1.86 per cent. Hence, it is seen that the seed are well stored with potash, as well as phosphoric acid, but the stems, roots, etc., are the parts containing the highest per cent of this constituent.

Nitrogen.

As is the case with phosphoric acid and potash, the percentage of nitrogen contained in the various parts of the cotton plant is influenced, within rather narrow limits, by the quantity and proportion in which the fertilizing constituents are combined in the fertilizer used. The highest per cent of nitrogen in the leaves and other vegetative parts was found in plants which were produced on unfertilized land, while its lowest per cent was present in the seed and stems, bolls, roots, etc., of plants receiving the fertilization indicated in Table I by NPK. Fertilization high in nitrogen and potash seemed to stimulate an increase of the nitrogen-content of the seed. The seed and leaves are very rich in this element, and especially so are the seed. The average nitrogen-content of the different parts of the cotton plant, analyses reported on dry sample, was found to be 1.46 per cent in the leaves; 2.98 per cent in the seed; .30 per cent in the lint; and .65 per cent in stems, roots, etc., combined. It might be noted in passing that the plot receiving the highest application of nitrogen, with normal quantities of phosphoric acid and potash and represented N_3PK , was the one from which the seed and lint of the cotton draw most heavily, in pounds per acre, upon the plant-food constituents of the soil. In other words, the plants, as the result of this heavy application of nitrogen, not only took up more nitrogen from the soil per acre in the seed and lint, but were enabled, directly or indirectly, thereby to remove more of the other fertilizing constituents than were removed as the result of any of the other fertilizer applications used. The explanation for this latter effect, resulting from a heavy application of nitrogen in the form of cotton-seed meal, would seem to lie either in increased solubility of the fertilizing constituents present in the soil through the action of weak organic acids formed by the decomposing meal, or in a strengthening of the attacking power of the root system as a result of the promotion of a heavier growth of all parts of the plant, accompanied by increased demands for these inorganic constituents by the plant organism, or to a combination of both.

Lime.

The percentage of lime in this plant seems to be quite constant under different fertilizer treatments, the average per cent found in the different parts of the dry mature plant being, 3.38 per cent in the leaves; .13 per cent in the seed; .19 per cent in the lint; and .54 per cent in the remainder of the plant taken together. As is seen, the leaves contain from six to twenty-six times as high per cent of this material as any other portion of the plant. The presence here in such proportionate large quantities is probably, in the main, due to two causes, viz.: (1) the leaves being the workshops of the plant, the lime which is taken up by its roots in large quantities is conducted through the stem to the leaves, where the amount essential for nutritive purposes is elaborated into proper form and dispatched where needed, while the excess, as is indicated, is stored, in some harmless compound or compounds, principally in the cells of the leaves; (2) it is an essential component of compounds entering normally into the composition of chlorophyll bodies which must be present in the leaves for assimilative processes to go on and new cells to be formed.

LINT.

The fiber is the main product for which the cotton plant is grown. Its proportion of the entire plant generally ranges from 10 to 11 per cent, and of the seed-cotton from 28 to 45 per cent. But these relations are governed to a considerable extent by the factors of season, soil, seed, fertilization, and cultivation.

Composition.—Cotton fiber is composed largely of cellulose, with smaller amounts of water, ash, protein, carbohydrates, fats, etc. As an average of the analyses recorded in Table I, it contains in an air-dried condition, 4.77 per cent water; 1.56 per cent ash; .11 per cent phosphoric acid; .62 per cent potash; .28 per cent nitrogen, and .18 per cent lime. Hence, it is seen that if only lint is sold from the farm cotton is one of the least, if not the least, in proportion to pecuniary returns, exhaustive crops grown, as the value of the fertilizing constituents contained in a 500-pound bale of lint cotton is on an average only about forty cents, of which about 57 per cent of it is due to nitrogen alone. On the other hand, it should be remembered that the selling of seed-cotton from the farm makes cotton a more exhaustive crop upon the fertility of the soil than corn at the present average annual yield of these crops for this State. Most of the substances contained in the lint were derived from the atmosphere, and hence are supplied to the growing plants in the greatest abundance and without cost to the producer.

Structure of Lint.—Fresh and mature individual cotton-fibers of the upland type—the one to which our North Carolina varieties belong—when examined in the field with a microscope present the gen-

eral appearance of partially and irregularly flattened thick-walled tubes twisted into spirals. Often the walls of the fibers are solid, partially or totally, in which instance their value is greatly reduced for commercial purposes. The fibers are tolerably uniform until about $\frac{4}{5}$ to $\frac{5}{6}$ of their length is reached, when they gradually taper to $\frac{1}{4}$ to $\frac{1}{3}$, their greatest diameter, and then abruptly end; the tapering portion of the fibers being usually cylindrical in form, with a decidedly strong tendency to a solid nature. It is the spiral character of the fibers and their resulting natural inclination to interlace and interlock that so admirably fits cotton lint to spinning purposes, for were the fibers devoid of this spiral form they would lie together without possessing any or very little binding power.

Length, Diameter, and Tensile Strength of Fibers.—Although increasing the yield of any variety in any year through higher fertilization of the same soil is generally accompanied by a slight shortening of the staple, yet the results recorded in Table II seem to indicate very strongly that there is also an independent and potent influence exerted by season; as, with two slight individual exceptions at Iredell, the fiber of the twelve varieties tested at both the Edgecombe and Iredell farms averaged longer in 1904 by 2.5 and 1.8 mm. respectively than in 1905, irrespective of yield, which, however, were not generally widely different in the two years.

The average length of the fiber of upland cotton as represented by these twelve varieties grown under North Carolina conditions, was found to be 21.3 mm. (.84 inch) as a result of four hundred and seventy-five measurements; while the weight required to break individual fibers (tensile strength) was 6.83 grams (.24 ounce). As a result of over eighteen hundred measurements of the lint of Russell's Big Boll cotton from the crops of 1902, 1903, and 1904, grown on the Edgecombe farm, it was found that the average length of the fibers of this typical short staple variety was 20.9 mm. and the diameter .0237 mm., while the average weight required to break individual fibers was 7.12 grams, which figures are not materially different from those given in Table II.

As the average length of the fibers of this typical variety are 882 times that of their diameter, then were the diameter of the average fiber magnified to one inch its length would be an irregularly hollow twisted tube $73\frac{1}{2}$ feet long. The weight of each fiber is, on an average, .000003024 or $\frac{1}{330688}$ gram, and as there are about 150,000,000 individual fibers in one pound of lint, the quantity in a pound would reach 1,948 miles if the fibers were placed end to end.

We have found, as an average of a considerable number of measurements, that the fibers on the crown (small) end of the seed are longer by .3 mm. than those on the butt end. It has also been observed that on imperfect seed (one-third the size of mature seed) the lint is about normal in length, but not in diameter and tensile

strength; in other words, it would seem that the length of the fiber is completed considerably before that of the maturity of the seed. Those fibers are generally most mature and regular in form that have been subjected directly to the desiccating influences of the sun and

TABLE II—GIVING THE YIELD, LENGTH AND TENSILE STRENGTH
UPLAND

Varieties.	Yield in Pounds of Seed-cotton per Acre.				Edgecombe		
	Edgecombe Farm.		Iredell Farm.		Length of Fiber in mm. ²		
	1904.	1905.	1904.	1905.	1904.	1905.	Average.
Russell's Big Boll-----	1,941	2,096	835	-----	21.6	19.5	20.6
Excelsior Prolific-----	1,761	1,757	790	802	21.1	20.4	20.8
Cook's Improved-----	1,818	1,747	695	938	21.8	18.8	20.3
Moss' Improved-----	1,288	1,605	500	706	22.5	20.4	21.5
Tool's Early Prolific-----	1,667	1,668	575	819	22.2	20.8	21.5
Shine's Extra Early Prolific-----	1,728	1,850	825	927	22.1	20.0	21.1
Peterkin's Improved (Craig's)-----	1,534	1,496	670	785	21.7	18.8	20.3
Black Texas Wood-----	1,544	1,747	525	806	22.7	19.8	21.3
Culpepper's Improved-----	2,031	1,983	790	974	24.3	20.0	22.2
Edgewood-----	1,733	1,841	760	873	23.3	19.8	21.6
Hodge-----	1,757	1,905	805	1,082	21.4	19.4	20.4
Webb-----	1,780	1,688	920	946	22.3	20.4	21.4
Averages-----	-----	-----	-----	-----	22.3	19.8	21.1

¹ The figures given for 1904 and 1905, for all the varieties at the different farms, are each

² One inch is equal to 25.4 mm.

³ One ounce is equal to 28.4 grams.

presence in lint is not only a constant source of annoyance in spinning, but a prolific cause for imperfect dyeing, resulting in a finished product of irregular appearance and diminished commercial value.

TABLE III—SHOWING THE COMBINED EFFECT OF LOCATION,

Varieties.	Edgecombe			
	Lint—Per Cent.			
	1902.	1903.	1904.	Average.
Russell's Big Boll-----	32.39	34.30	31.75	32.81
Culpepper's Improved-----	34.62	35.83	33.07	34.51
King's Improved-----	36.60	39.20	38.21	38.00
Peterkin's Improved-----	39.10	40.94	38.67	39.57

atmosphere; hence, bolls held in a horizontal plane contain fibers of most perfect development on top and at the ends of the locks extending beyond the divisions of the bolls.

Also, immature and unripe fibers do not take dye well, and their

OF THE FIBER OF TWELVE REPRESENTATIVE VARIETIES OF COTTON.¹

Farm.			Iredell Farm.						Red Springs Farm.	
Tensile Strength of Fiber in Grams. ³			Length of Fiber in mm.			Tensile Strength of Fiber in Grams.			Length of Fiber in mm.	Tensile Strength of Fiber in Grams.
1904.	1905.	Average.	1904.	1905.	Average.	1904.	1905.	Average.	1904.	1904.
6.15			21.0			6.95			21.4	7.15
6.80	8.70	7.75	23.0	19.6	21.3	5.30	5.70	5.50	21.1	6.50
6.45	7.55	7.00	21.5	19.2	20.4	5.10	8.40	6.75	21.6	7.60
6.30	9.00	7.65	20.7	19.2	20.0	5.05	6.60	5.83	22.2	7.20
5.80	6.70	6.25	22.7	21.0	21.9	5.55	7.20	6.38	20.8	5.70
3.65			21.9	19.8	20.9	8.00	5.85	6.93	22.5	6.40
7.75	6.60	7.18	20.9	20.4	20.7	8.30	7.25	7.78	21.0	8.20
8.10	4.75	6.43	21.7	21.6	21.7	8.05	6.00	7.03	21.7	5.60
6.30	7.20	6.75	21.7	21.6	21.7	6.90	6.20	6.55	21.5	6.40
6.30	6.55	6.43	23.0	20.8	21.9	5.95	6.00	5.98	23.0	7.55
7.95	5.00	6.48	23.2	19.8	21.5	6.90	5.85	6.38	21.3	9.60
7.80	7.70	7.75	22.1	19.2	20.7	6.00	7.65	6.83	21.4	6.05
6.61	6.98	6.97	22.0	20.2	21.2	6.50	6.61	6.54	21.6	6.99

averages of from five to ten measurements of both length and tensile strength of fibers.

Effect of Variety upon Percentage of Lint.—In the following table are incorporated the results of three years' work conducted at the Edgecombe and Red Springs Test farms of the Department with four well-known varieties of cotton:

SOIL, ETC., UPON THE PROPORTION OF LINT AND SEED.

Farm.				Red Springs Farm.							
Seed—Per Cent.				Lint—Per Cent.				Seed—Per Cent.			
1902.	1903.	1904.	Average.	1902.	1903.	1904.	Average.	1902.	1903.	1904.	Average.
67.61	65.70	68.25	67.19	34.33	32.81	35.70	34.30	65.62	67.19	64.30	65.70
65.38	64.17	66.93	65.49	37.50	37.50	37.39	37.46	62.50	62.50	62.61	62.54
63.40	60.80	61.79	62.00	39.06	40.62	39.61	39.76	60.94	59.38	60.39	60.24
60.90	59.06	61.33	60.43	40.63	39.06	41.07	40.25	59.37	60.94	58.93	59.75

During the time embraced in the comparison above, Russell's Big Boll has averaged the lowest percentage of lint to seed with 32.81 per cent, while Peterkin's Improved has stood highest with 39.57 per cent, an average excess of 6.76 per cent over Russell's Big Boll. Per cent of lint, however, must not be confounded with that most important factor of yield, for it has been found, as a result of rather extended investigation with about forty varieties, that often those varieties yielding the smallest or medium percentages of lint are the ones that produce the largest number of pounds of lint per cent, notwithstanding their small percentage yield of lint. In a detailed study of Russell's Big Boll cotton during the past four or five years, it has also been demonstrated that increasing the percentage of lint is generally naturally accompanied by a decrease in the length of the lint and an increase in its diameter, which are characteristics detracting somewhat from the commercial value of the lint.

Effect of Location, Soil, etc., upon Percentage of Lint.—As shown by Table III, the percentage of lint produced by the different varieties during three consecutive years were, with two exceptions occurring in 1903, always higher at Red Springs than in Edgecombe, while the average results for the former locality were invariably higher than those at the latter, the increase being 1.49 per cent with Russell's Big Boll; 2.95 per cent with Culpepper's Improved; 1.76 per cent with King's Improved, and 0.67 per cent with Peterkin's Improved. That a more complete understanding of the results may be obtained, it should be stated that these tests were conducted at Red Springs on a coarse sandy soil possessing a sandy-clay subsoil at a depth of 12 to 15 inches, while in Edgecombe they were located on a soil consisting of sandy loam, with moderately fine sand, underlaid by a rather tenacious sandy-clay subsoil at a depth of 8 to 12 inches. It would therefore seem that the variations observed between the percentages of lint by the same variety at the same farm in different years will have to be largely accredited directly to differences in yield due to more favorable conditions for growth and development that obtained in the soil.

Effect of Field Selection of Seed upon Percentage and Length of Lint.—In working with Russell's Big Boll variety during the past three years, the effect of field selection of seed has been marked, as the difference between the highest and lowest percentage of lint to seed obtained in 1904 was 11.25 per cent: while that started with in 1902 on the parent samples was only 3.64 per cent. In the length of staple, the difference between the shortest and longest fiber was 1.2 mm. at starting, and in two generations the divergence had increased to 11 mm. The per cent of lint to seed produced by the progeny of one sample had been increased 6.46 per cent, while the length of the staple of another had been increased 6.4 mm. within two generations by selection.

SEED.

The seed, being complementary of the lint, constitute from 60 to 72 per cent of the seed-cotton, and usually sell for 1-7 to 1-5 as much per acre as the lint.

Composition and Fertilizing Value.—The composition of cotton seed will be influenced to a slight extent by variety, soil, season, etc. The average results given in Table III, which are 2.95 per cent nitrogen, 1.42 per cent phosphoric acid, and 1.19 per cent potash on air-dry sample, will approximate very closely to their average composition. When using the values assigned to these constituents in mixed fertilizers, the fertilizing value of cotton seed will be \$14.39 per ton. This amount represents the value of reserve plant-food materials of the soil that are removed from the farm in every ton of seed sold. If seed are sold, then cotton-seed meal or some other suitable nitrogenous fertilizing material should be returned to the soil in order to maintain the supply of plant-food. A material high in nitrogen is advised, because about 82 per cent of the value of cotton seed is due to their content of nitrogen. However, the best way, because in most instances the cheapest, to return to the soil the equivalent of nitrogen removed in the seed is by the growth of some leguminous crop, such as cowpeas, vetch, alfalfa, soy and velvet beans, all the clovers, etc. When the whole plants or the vines only of these legumes are returned to the soil, either directly or after their passage through the bodies of animals, an average good crop will restore to the soil as much or more nitrogen than was removed in the seed of the previous cotton crop. The growth of vetch and bur-clover in rotation with cotton following cotton or corn is treated at some length in a Bulletin of the North Carolina Department of Agriculture, issued during July, 1904. The mineral fertilizing constituents—phosphoric acid and potash—in a ton of cotton seed are worth \$2.58, when valued according to the price paid for them in mixed fertilizers during the past year. This amount of the mineral fertilizing constituents, of course, should be returned to the soil in some suitable available form, if it is expected to maintain permanent fertility.

Oil.—The amount of oil present in cotton seed varies usually from 16 to 23 per cent; its content being influenced by inherent tendencies of the seed and environmental conditions to which the plants are subjected during growth.

As a result of three years' field selection, we have caused the percentage of oil in seed from different stalks of the same variety grown in the same field to vary as much as 4 per cent. It has been pretty definitely settled—certainly for the variety studied—that increasing the oil-content of the seed is accompanied by an increase in the tensile strength of its individual fibers without decreasing the per cent of lint to the seed.

Effect of Yield upon Percentage of Seed.—By taking the average of results at the Edgcombe, Red Springs, and Iredell Test farms of twenty varieties grown in 1904 and of as many of these as were grown in 1903, it is demonstrated that increasing the yield of seed cotton per acre of most varieties, whether on the same type or differ-

TABLE IV—SHOWING THE PROPORTION OF KERNELS AND

Laboratory Number— (F Series).	Varieties.	Whole Seed.		Percentage Composition					
		Kernels—Per Cent.	Hulls—Per Cent.	Moisture.	Kernels.				
					Oil.	Nitrogen (N).	Phosphoric Acid, (P ₂ O ₅).	Potash, (K ₂ O).	Lime, (CaO).
259	Culpepper's Improved -----	55.98	44.02	7.16	38.55	4.65	2.27	1.38	.14
260	Cook's Improved -----	56.94	43.06	5.76	38.51	5.14	2.46	1.29	.17
261	King's Improved -----	59.31	40.69	5.77	39.78	4.85	2.48	1.32	.12
262	Peterkin's Improved -----	56.73	43.27	5.26	42.02	4.64	2.53	1.37	.14
263	Moss' Improved -----	56.26	43.74	6.58	38.49	4.94	2.46	1.32	.12
264	Russell's Big Boll -----	55.54	44.46	5.32	41.75	4.50	2.27	1.48	.13
265	Texas Big Boll -----	57.64	42.36	5.96	38.55	5.06	2.28	1.26	.24
266	Hodge -----	56.10	43.90	5.32	41.90	4.37	2.61	1.34	.15
267	Mebane's Triumph -----	56.42	43.58	5.54	38.14	5.00	2.41	1.32	.12
268	Excelsior Prolific -----	54.94	45.06	7.37	37.26	5.06	2.38	1.38	.15
269	Tool's Early Prolific -----	61.35	38.65	6.91	39.84	5.76	2.36	1.29	.17
270	Shine's Extra Early Prolific -----	53.54	46.46	5.28	40.35	4.76	2.34	1.32	.11
271	Edgewood -----	55.90	44.10	6.14	38.84	4.54	2.42	1.36	.14
272	Webb -----	56.58	43.42	5.36	41.05	4.76	2.54	1.38	.12
273	Missionary -----	57.45	42.55	4.89	40.84	4.94	2.35	1.34	.17
274	Speight's Prolific -----	57.38	42.62	5.37	39.81	4.54	2.51	1.30	.15
275	Peterkin's Improved (Craig's) -----	60.78	39.22	5.37	39.42	5.10	2.46	1.33	.13
276	Black Texas Wood -----	62.04	37.96	5.89	40.22	4.98	2.30	1.26	.16
277	Brown Texas Wood -----	59.58	40.42	5.44	38.75	5.44	2.40	1.25	.15
278	White's Long Staple -----	57.48	42.52	6.97	38.53	4.70	2.30	1.30	.12
279	Florodora -----	57.47	42.53	6.31	40.32	4.38	2.22	1.39	.13
	Average of twenty-one varieties -----	57.40	42.60	5.90	39.66	4.86	2.40	1.33	.14

¹ All determinations were made in duplicate, but only averages are reported below.

farm during 1904. It will be observed that the percentage of kernels to hulls in the different varieties varied from 62.04 per cent with Black Texas Wood, down to 53.54 per cent with Shine's Extra Early Prolific, with an average of 57.40 per cent and a "greatest difference" of 8.50 per cent, which difference is equivalent to 170 pounds of kernels per ton of seed. As the hulls are complemental of

ent types of soil in a different locality, seems usually to be attended by an increase in per cent of seed and decrease in per cent of lint.

Proportion and Composition of Kernels and Hulls of Different Varieties.—In Table IV are brought together results obtained on seed of twenty-one varieties of cotton grown on the Edgecombe Test

HULLS OF DIFFERENT VARIETIES AND THEIR COMPOSITION.

on Air-dried Sample.¹

Percentage Composition on Dry Basis.

Hulls.						Kernels.					Hulls.				
Moisture.	Ash.	Nitrogen, (N).	Phosphoric Acid, (P ₂ O ₅).	Potash, (K ₂ O).	Lime, (CaO).	Oil.	Nitrogen, (N).	Phosphoric Acid, (P ₂ O ₅).	Potash, (K ₂ O).	Lime, (CaO).	Ash.	Nitrogen, (N).	Phosphoric Acid, (P ₂ O ₅).	Potash, (K ₂ O).	Lime, (CaO).
10.92	2.16	.44	.12	1.12	.09	41.52	4.99	2.43	1.48	.15	2.42	.49	.14	1.25	.10
10.94	1.97	.48	.14	1.04	.13	40.86	5.45	2.59	1.36	.17	2.21	.53	.15	1.16	.14
11.67	1.89	.40	.12	.86	.10	41.58	4.86	2.71	1.40	.12	2.13	.45	.13	.97	.11
10.47	2.11	.41	.11	1.01	.12	44.35	4.89	2.67	1.44	.14	2.35	.45	.12	1.12	.13
11.53	2.12	.41	.16	.89	.14	41.19	5.28	2.63	1.40	.12	2.39	.46	.17	1.00	.15
10.03	2.47	.51	.17	1.08	.12	44.09	4.75	2.39	1.56	.14	2.75	.56	.19	1.19	.13
11.25	2.08	.47	.08	.96	.15	40.94	5.40	2.42	1.33	.24	2.34	.52	.09	1.08	.16
10.80	2.20	.50	.11	.99	.14	44.25	4.59	2.75	1.42	.16	2.46	.61	.12	1.10	.15
10.68	2.50	.44	.11	1.01	.16	40.37	5.29	2.55	1.39	.12	2.78	.49	.12	1.13	.18
11.50	2.40	.50	.11	1.13	.12	40.21	5.45	2.55	1.48	.16	2.71	.56	.11	1.28	.12
11.83	2.56	.49	.14	1.02	.13	42.78	6.18	2.53	1.59	.17	2.90	.55	.15	1.16	.14
10.29	2.50	.44	.14	1.02	.12	42.59	5.02	2.48	1.39	.11	2.78	.49	.15	1.13	.13
9.17	2.15	.47	.11	.93	.10	41.36	4.83	2.57	1.44	.14	2.35	.51	.12	1.02	.10
10.33	2.45	.46	.15	.99	.12	43.38	5.02	2.68	1.45	.13	2.73	.51	.16	1.10	.13
9.12	2.33	.49	.11	1.12	.09	42.93	5.19	2.47	1.40	.16	2.56	.53	.13	1.23	.10
10.09	2.14	.52	.14	.89	.11	42.06	4.69	2.65	1.36	.15	2.37	.57	.15	.98	.12
10.21	2.15	.48	.11	1.02	.10	41.65	5.38	2.58	1.40	.13	2.39	.53	.11	1.13	.10
10.93	2.38	.49	.10	1.22	.10	42.71	5.25	2.43	1.33	.17	2.66	.55	.11	1.36	.11
10.17	2.32	.51	.17	.91	.14	40.96	5.75	2.53	1.32	.15	2.58	.56	.18	1.01	.15
9.97	1.93	.45	.10	.89	.11	41.41	5.05	2.47	1.39	.12	2.13	.49	.10	.98	.12
10.30	2.02	.48	.10	1.05	.12	43.01	4.67	2.36	1.47	.13	2.25	.53	.11	1.16	.12
10.58	2.23	.47	.12	1.01	.12	42.10	5.14	2.54	1.41	.14	2.48	.52	.13	1.12	.12

the kernels, Black Texas Wood contained them in the smallest percentage and Shine's Extra Early Prolific in the highest, with an average for the twenty-one varieties of 42.60 per cent.

The average percentage of moisture in the air-dried kernels varied from 4.89 to 7.37, with an average of 5.90; while that in the hulls ranged from 9.13 to 11.83, with the average at 10.58, which is 1.8 times as much as is present in the kernels.

Peterkin's Improved contained the highest percentage of oil in the kernels, with 42.02 per cent, which is equal to 23.44 per cent of the whole seed, while Excelsior Prolific contained the smallest percentage, with 37.26 per cent of the kernel and 20.47 per cent of the entire seed as oil. This difference of 4.76 per cent of oil in the kernels between these two varieties is equal to over 6 gallons of oil per ton of seed. As an average of all the results of the different varieties, the kernels contained 39.66 per cent and the whole seed 22.76 per cent of oil.

On the original sample there is on an average of 4.86 per cent nitrogen, 2.40 per cent phosphoric acid, 1.33 per cent potash, and .14 per cent lime in the kernels; and 2.27 per cent ash, .47 per cent nitrogen, .12 per cent phosphoric acid, 1.01 per cent potash, and .12 per cent lime in the hulls. In the kernels the percentage of nitrogen varied from 4.37 to 5.76; phosphoric acid, 2.22 to 2.61; potash, 1.26 to 1.48; and lime .11 to .24 per cent; while in the hulls

TABLE V—SHOWING THE EFFECT OF KIND AND QUANTITY OF THE PERCENTAGES OPEN AT THE

EDGECOMBE

Number.	Fertilizer.	Formula.	Yield Seed-cotton in Pounds per Acre.	
			In 1903.	In 1904.
1	Nothing-----	O	1267.50	1157.50
2	{ 169.8 pounds acid phosphate----- 61.7 pounds kainit----- 137.6 pounds cotton-seed meal----- }	NPK	1220.00	1342.50
3	{ 129.2 pounds acid phosphate----- 18.7 pounds kainit----- 412.8 pounds cotton-seed meal----- }	N ₃ PK	2120.00	1990.00
4	{ 550.3 pounds acid phosphate----- 61.7 pounds kainit----- 137.6 pounds cotton-seed meal----- }	NP ₃ K	1170.00	1177.50
5	{ 169.8 pounds acid phosphate----- 228.2 pounds kainit----- 137.6 pounds cotton-seed meal----- }	NPK ₃	1392.50	1365.00
6	{ 425.5 pounds acid phosphate----- 154.2 pounds kainit----- 344.0 pounds cotton-seed meal----- }	2½NPK	1630.00	1722.50

¹The varieties used in these tests were Culpepper's Improved at Red Springs and Experiment Station, Russell's Big Boll at Edgecombe, and King's Improved at Iredell.

²In 1904, blood and manure salt replaced cotton-seed meal and kainit in the fertilizer mixture at all the farms, enough being used to supply exactly the same amount of all the fertilizing constituents per acre as was supplied by the combination given and which was used in 1903.

the variations were: ash, 1.89 to 2.57; nitrogen, .40 to .52; phosphoric acid, .08 to .18; potash, .86 to 1.22; and lime, .10 to .17 per cent.

Potash, phosphoric acid, and nitrogen are present in the kernels and hulls in the proportion of 1:1.8:3.6 and 1:1.1:5 respectively.

By calculation from data contained in Table IV it will be seen that the average composition of whole cotton seed of all varieties studied is nitrogen, 2.95 per cent; phosphoric acid, 1.42 per cent; and potash, 1.19 per cent.

Effect of Fertilization upon Maturity.—In Table V will be found embodied the results of two years' work on four distinct types of soil located in different parts of the State, which show very clearly and strikingly the effect that fertilizing mixtures of different compositions and in varying quantities have upon the maturation of the cotton plant as indicated by the percentage of cotton open at the first and second pickings.

FERTILIZATION UPON MATURITY OF COTTON AS INDICATED BY SEVERAL PICKINGS DURING 1903 AND 1904.¹

FARM.

Per Cent of Seed-cotton Open at the Several Pickings.

First Picking.			Second Picking.			Third Picking.			First and Second Pickings.
In 1903—September 29.	In 1904—October 1.	Average.	In 1903—October 21.	In 1904—November 12-17.	Average.	In 1903—December 18.	In 1904—January 11.	Average.	Average of Two Years.
20.5	57.9	39.2	54.4	38.9	46.7	25.1	3.2	14.1	85.9
45.9	-----	45.9	40.2	-----	40.2	13.9	-----	13.9	86.1
32.5	60.3	46.4	47.6	31.7	39.7	19.9	8.0	13.9	86.1
43.6	83.2	63.4	42.7	15.3	29.0	13.7	1.5	7.6	92.4
45.2	65.6	55.4	43.1	31.5	37.3	11.7	2.9	7.3	92.7
51.5	69.7	60.6	38.7	28.5	33.6	9.8	1.8	5.8	94.2

TABLE V—SHOWING THE EFFECT OF KIND AND QUANTITY OF THE PERCENTAGES OPEN AT THE SEVERAL

RED SPRINGS

Number.	Fertilizer.		Yield Seed-cotton in Pounds per Acre.	
	Application. ²	Formula.	In 1903.	In 1904.
1	Same as No. 1 above-----	O	600.00	347.50
2	Same as No. 2 above-----	NPK	1020.00	927.50
3	Same as No. 3 above-----	N ₂ PK	1400.00	1207.50
4	Same as No. 4 above-----	NP ₂ K	1250.00	1032.50
5	Same as No. 5 above-----	NPK ₃	1090.00	865.00
6	Same as No. 6 above-----	2½NPK	1580.00	1225.00

IREDELL

1	Same as No. 1 above-----	O	380.00	337.50
2	Same as No. 2 above-----	NPK	925.00	1280.00
3	Same as No. 3 above-----	N ₂ PK	780.00	1070.00
4	Same as No. 4 above-----	NP ₂ K	1130.00	1387.50
5	Same as No. 5 above-----	NPK ₃	1275.00	1305.00
6	Same as No. 6 above-----	2½NPK	870.00	1250.00

EXPERIMENT

1	Same as No. 1 above-----	O	211.20	221.20
2	Same as No. 2 above-----	NPK	1021.80	1230.00
3	Same as No. 3 above-----	N ₂ PK	944.20	1202.40
4	Same as No. 4 above-----	NP ₂ K	823.00	1144.60
5	Same as No. 5 above-----	NPK ₃	731.20	820.00
6	Two times No. 2 above-----	2NPK	1178.20	1391.20

¹The varieties used in these tests were Culpepper's Improved at Red Springs and Experiment Station, Russell's Big Boll at Edgecombe, and King's Improved at Iredell.

²In 1904, blood and manure salt replaced cotton-seed meal and kainit in the fertilizer mixture at all the farms, enough being used to supply exactly the same amount of all the fertilizing constituents per acre as was supplied by the combination given and which was used in 1903.

FERTILIZATION UPON MATURITY OF COTTON AS INDICATED BY PICKINGS DURING 1903 AND 1904—*Continued*.¹

FARM.

Per Cent of Cotton Open at the Several Pickings.

First Picking.			Second Picking.			Third Picking.			First and Second Pickings.
1903—September 23.	1904—September 22.	Average.	1903—October 12.	1904—October 18.	Average.	1903—November 16.	1904—November 22.	Average.	Average of Two Years.
0.0	21.6	10.8	31.7	66.2	48.9	68.3	12.2	40.3	59.7
37.3	55.0	46.2	34.3	35.0	34.6	28.4	10.0	19.2	80.8
37.9	50.5	44.2	35.7	44.7	40.2	26.4	4.8	15.6	84.4
45.6	54.2	49.9	32.0	41.6	36.8	22.4	4.2	13.3	86.7
32.1	46.2	39.2	40.4	46.8	43.6	27.5	7.0	17.2	82.8
44.3	39.2	41.8	38.0	53.9	45.9	17.7	6.9	12.3	87.7

FARM.

Oct. 12	Oct. 3		Nov. 7	Oct. 26		Jan. 5	Dec. 9		
21.1	17.0	19.1	26.3	50.4	38.3	52.6	32.6	42.6	57.4
27.6	33.3	33.0	35.4	42.6	39.0	37.0	19.1	28.0	72.0
23.1	37.4	30.3	36.5	50.5	43.5	40.4	12.1	26.2	73.8
31.9	41.6	36.8	35.0	44.0	39.5	33.1	14.4	23.7	76.3
26.5	32.4	29.5	40.8	49.2	45.0	32.7	18.4	25.5	74.5
36.2	47.2	41.7	39.7	40.8	40.3	23.1	12.0	17.6	82.0

STATION FARM.

Sept. 25	Sept. 29		Oct. 14	Oct. 13		Dec. 8	Jan. 2		
9.8	0.0	4.9	39.1	27.1	33.1	51.1	72.9	62.0	38.0
18.9	30.1	24.5	47.9	42.4	45.1	33.2	27.5	30.3	69.7
37.0	31.4	34.2	46.0	42.0	44.0	17.0	26.6	21.8	78.2
45.4	40.0	42.7	41.4	39.4	40.4	13.2	20.6	16.9	83.1
23.6	19.9	21.8	42.8	42.8	42.8	33.6	37.3	35.4	64.6
59.6	42.8	51.2	24.6	35.1	29.9	15.8	22.1	18.9	81.1

It will be observed that during the period covered by these tests fertilizers of different compositions and quantities hastened the maturity of this plant on all the farms. On the unfertilized plats it was found that, without exception, the larger the yield the greater the combined percentage of cotton open at the first two pickings; while, between the two years, the larger the yield on the same soil at the same farm, the smaller the percentage open at the first picking, with the exception of Iredell, at which place larger yields for any cause were invariably accompanied by greater per cent open at the first picking. This divergence is, in all probability, due to the great importance that attaches to early maturity at the Iredell farm, which is located on a heavy clay soil just within the northern limit of the growth of this plant and at which the earlier maturing varieties have always produced larger yields. On the sandy soils of the Edgecombe and Red Springs farms a larger percentage of total crop was picked at the end of the first two pickings from both fertilized and unfertilized plats than was gathered by the same pickings from the corresponding plats at the Iredell and Experiment Station farms, which are of a red-clay character. With two exceptions occurring in 1904 in favor of high phosphoric acid (NP_3K) applications, heavy [$2\frac{1}{2}$ (NPK)] application plats at Red Springs, Iredell and Edgecombe had a larger per cent of their total yield open at the end of the second picking than any of the other plats; while at the Experiment Station farm the high phosphoric acid (NP_3K) plat was in the lead. The average per cent open at the first picking was highest at Edgecombe and Red Springs as a result of high phosphoric acid (NP_3K) fertilization; while at Iredell and the Experiment Station heavy [$2\frac{1}{2}$ (NPK) and 2 (NPK) respectively] applications were greatest.

With two exceptions occurring in 1903, high nitrogen (N_3PK) applications at all the farms yielded a larger percentage of cotton open at the first picking than high potash (NPK_3) applications. At the end of the second picking, as the average of two years' results, high potash (NPK_3) plats were highest at the Iredell and Edgecombe farms, and high nitrogen (N_3PK) plats highest at the Red Springs and the Experiment Station farms. Also, high nitrogen (N_3PK) applications have averaged a greater percentage of seed cotton open at the end of the second picking at all the farms, except Edgecombe, at which place both were the same, than those plats receiving a normal (NPK) application.

From data contained in Table V, the following tentative deductions therefore may be made relative to the growth of cotton under the conditions that obtained during the conducting of experiments, results of which are tabulated above:

1. Fertilization with ordinary applications of commercial fertilizers hastens maturity.

2. Sandy and sandy-loam soils, whether fertilized or unfertilized, yield a larger percentage of total cotton open at the first two pickings combined than do red-clay soils.

3. High phosphoric acid (NP_3K) fertilization on sandy and sandy-loam soils, and heavy X (NPK) applications on red-clay soils produced the largest percentages of cotton open at the first picking.

4. Normal (NPK) fertilization yields on both sandy and red-clay soils a larger percentage open at the first picking than high nitrogen (N_3PK) applications, while the reverse is true when total per cent open at end of second picking is considered.

5. High nitrogen (N_3PK) applications generally yield on all soils larger percentages open at the first picking than high potash (NPK_3) fertilization.

CORRELATION OF CHARACTERS OF VARIETIES.

With cotton, as with other crops, it is of the highest importance for farmers and imperative for all those who are studying and trying to improve varieties, to know what characters are usually antagonistic and what ones are mutually helpful in their economic development.

In Table VI are compiled, in concise form, the results of three years' tests at Edgecombe and Iredell and two years at Red Springs; and from this compilation, supplemented by observation in the field and at the gin, the following tentative inferences are made in reference to the varieties of upland cotton tested, when grown under the conditions of climate and soil as represented by these three farms:

Antagonistic Characters.—(1) Earliness in maturity is not usually conducive to large yields, although in areas where only a short growing period is afforded for any reason the earlier maturing varieties often give the greater yields (but these are not large generally), as is shown by King's Improved, which, during the past three years, has proven the most prolific of seed cotton at the Iredell farm, where the growing period for cotton during an average season is comparatively short. (2) Varieties that have large seed generally yield a small percentage of lint to seed. (3) Late-maturing varieties do not generally produce seed cotton that yields a high percentage of lint, although the number of pounds of lint per acre may be large. (4) Increasing the oil-content of the seed of any variety is accompanied by an increase in the tensile strength of its fiber without necessarily decreasing its per cent to seed, and conversely. (5) Lengthening the staple of any variety through selection tends to the reduction of the percentage of lint and to a decrease in its diameter and tensile strength, and conversely. (6) Small-bolled varieties are not generally easily picked, and hence are unpopular with pickers.

Associated Characters.—(1) Varieties that mature early usually have small seed and produce a high percentage of lint to seed. (2) Varieties with short staple usually have medium to high percentages of

TABLE VI—COMPILED RESULTS OF VARIETY TESTS OF COTTON,
SHOWING RELATIVE EARLINESS, VALUE, YIELDS AND SIZE OF
BOLLS, SEED AND STALKS.¹

EDGECOMBE FARM.

Varieties.	Number of Years Tested.	Rank According to the Following Characters.								
		Earliness as Shown by Percentage of Bolls Open at First Picking. ²	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed. ³	Height of Stalks. ⁴	Value of Total Products (Lint and Seed).
Russell's Big Boll -----	3	5	5	1	5	1	1	1	3	4
Culpepper's Improved -----	3	2	3	3	3	3	2	3	4	5
Excelsior Prolific -----	3	3	1	4	2	4	5	5	2	1
Edgewood -----	3	1	2	2	4	2	3	2	4	2
Peterkin's Improved -----	3	4	4	5	1	5	4	4	1	3

RED SPRINGS FARM.

Russell's Big Boll -----	2	5	6	2	5	1	1	1	5	6
Edgewood -----	2	3	5	3	4	2	3	3	1	5
Culpepper's Improved (Red Springs) -----	2	2	2	1	3	3	2	2	2	2
Peterkin's Improved -----	2	6	3	5	2	4	4	5	4	3
King's Improved -----	2	1	4	6	1	5	6	6	6	4
Excelsior Prolific -----	2	4	1	4	2	4	5	4	3	1

IREDELL FARM.

King's Improved (Native) -----	3	1	1	1	4	3	5	3	5	1
King's Improved -----	3	2	2	3	1	6	6	4	6	2
Culpepper's Improved -----	3	4	3	2	6	1	1	1	3	3
Edgewood -----	3	5	4	4	5	2	2	2	4	4
Excelsior Prolific -----	3	3	5	5	3	4	4	5	1	5
Peterkin's Improved -----	3	6	6	6	2	5	3	6	2	6

¹ The comparisons of varieties in this table are the average of the results of the tests of 1903, 1904 and 1905 at Edgcombe and Iredell and of 1903 and 1904 at Red Springs.

² Results in this column for the Edgcombe Farm were obtained from data of 1904 and 1905 only.

³ Results in this column for the Red Springs Farm were obtained from data of 1904 only.

⁴ Results in this column for the Edgcombe Farm were obtained from data of 1903 only.

lint and kernels, and conversely. (3) Varieties with large bolls generally have large seed and medium to small percentages of lint. (4) Increasing the yield of seed cotton per acre, through proper fertilization or favorable seasonal conditions, results generally in a slight lowering of the percentage of lint to seed, or in other words in an increased size and percentage of seed to lint, even of the same variety. (5) Varieties with large bolls and seed usually germinate well, grow vigorously, and are less affected by adverse seasonal and soil conditions during their active growing period; but are generally medium to late in maturity, and hence may stand in danger of being cut off by frost in the fall, if a comparatively long growing period is not afforded. (6) Good root and leaf development of a variety tend to increased power of resistance to drought and insect and disease ravages.

VARIETIES.

Six years ago the Department of Agriculture, by means of its test farms, began comparative tests of varieties of cotton with the purpose, primarily, of ascertaining, if possible, the varieties that are most prolific of seed cotton per acre, when grown under our conditions of soil and climate. During this time tests have been made with thirty-seven varieties, the number ranging from seven or eight in 1900 to twenty-five in 1904 in the different tests on the different farms. It is felt from this accumulated data of five years' tests that some very reliable and valuable information has been derived, especially if taken and intelligently applied by the individual farmers of the State in their farming operations.

Variation in Yield of Varieties.—In our variety tests we have had some variety or varieties to yield 700 to 800 pounds of seed cotton per acre more than other varieties in the same tests and grown under identical conditions of soil, fertilization, and cultivation. This variation in yield has been no uncommon occurrence in our experience. Take, for instance, the results at the Edgecombe farm during the past five years. In 1900, in a test of eight varieties, the difference between the variety yielding the largest amount of seed cotton per acre and the one the smallest, was 565 pounds; in 1901 and 1902 in tests of seven varieties each, the difference was 520 and 790 pounds respectively; in 1903, 663 pounds, when nine varieties were incorporated, and 724 pounds in 1904 in a test of twenty-one varieties. The average of these differences, during five years' tests, is almost equal to seven-tenths of the average annual yield per acre of seed cotton in North Carolina. To grow cotton cheaply per pound, more must be produced per acre than is at present being done on an average. To do this, better varieties must be planted, more thorough preparation and cultivation be given to the land, and more intelligent fertilization, either directly or indirectly, must be practised. It costs no more to cultivate a prolific variety of cotton than one that has few

bolts to the stalk, or has a larger number of stalks missing in the row due to imperfect germination of the seed or some other avoidable or unavoidable cause.

What a Variety Should Be.—A variety of cotton should be a group of plants having some special excellencies, such as total yield of lint per acre, resistance to disease and insect pests, etc., and the seed of which should be able to transmit to their progeny, with certainty and without diminution, the excellent qualities of the parent plants. If the designated group of plants does not have these qualities, then it is not worthy to be styled a variety. Neither should the same variety have two names.

Early Maturing Varieties.—The earliest varieties, judged from the percentage of total cotton open at first picking in the past two years' tests at the test farms of the Department, are Dozier's Improved, King's Improved, Hodge, Shine's Extra Early Prolific, Missionary, and Webb. The first two named are probably the earliest maturing varieties we have thus far tested. They are especially adapted for growth in regions where cotton is liable to be cut off by frost, mattering not whether the prolonged growth be due to climate or soil.

Medium Maturing Varieties.—Culpepper's Improved, Cook's Improved, Excelsior Prolific, Peterkin's Improved, and Edgewood are varieties that matured during the past year at a medium date. Peterkin's Improved and Edgewood were late in maturing during the past year at the Iredell farm, but medium at the other two—Edgecombe and Red Springs.

Late Maturing Varieties.—Russell's Big Boll, Black Texas Wood, Brown Texas Wood, Tool's Early Prolific, and Moss' Improved were the latest varieties tested. Some of these are good yielding varieties when grown where the season is long enough for complete development of their bolls before frost.

Varieties with High Percentage of Lint.—Of the varieties tested, Moss' Improved, King's Improved, Brown Texas Wood, Peterkin's Improved, Cook's Improved, Tool's Early Prolific, Hodge, and Excelsior Prolific are the ones that have yielded the highest percentage of lint to seed. With these varieties in 1904 the percentage of lint to seed varied from 35.42 per cent with Excelsior Prolific at the Edgecombe farm to 43.03 per cent with Moss' Improved at Iredell. The percentage yield of lint alone of a variety is frequently an unsafe guide in selecting a variety that will produce a large amount of lint cotton per acre.

Varieties with Large Bolls.—Russell's Big Boll, Culpepper's Improved, and Edgewood are the three varieties thus far tested that possess the largest-sized bolls as well as seed. As an average of four years' tests at the Edgecombe farm and three years' each at the Red Springs and Iredell farms, it has required the following number of

bolls to yield a pound of seed cotton: Russell's Big Boll at Edgecombe, 54; at Red Springs, 64; and at Iredell, 72. Culpepper's Improved at Edgecombe, 61; at Red Springs, 71; and at Iredell, 74. Edgewood at Edgecombe, 72; at Red Springs, 77; and at Iredell, 79. These are late varieties and heavy producers of both lint and seed when planted upon soils that will mature them before frost.

Varieties Adapted to the Eastern and Southeastern Sections of the State.—After a study of our results with varieties obtained at the Edgecombe and Red Springs farms during the past four or five years, it is found that of the varieties of cotton thus far tested, Excelsior Prolific, Edgewood, Culpepper's Improved, King's Improved, Russell's Big Boll, and Peterkin's Improved have yielded the largest amounts of seed cotton per acre on an average. In the eastern part of the State, on the stiffer clayey soils, bottom-lands, poorly drained lands and lands near the northern border of the State, it will generally be found advisable to use the best of the earlier maturing varieties, such as King's Improved, Edgewood, and Excelsior Prolific; while on the more open sandy and loamy soils of the east and southeast, the larger-bolled and more vigorously growing varieties, such as Culpepper's Improved and Russell's Big Boll, will generally yield most satisfactory returns.

Varieties Adapted to Piedmont Section of the State.—With reference to varieties of cotton suited to this portion of the State, we cannot assert with the same degree of certainty as we can for the eastern part of the State, as our experiments have only been conducted in Iredell for three years, and with some of the varieties for only the past season. So with reference to this portion of the State on a red-clay soil, we would recommend, tentatively, guided by our results, the use of either King's Improved, Culpepper's Improved, Edgewood, or Excelsior Prolific as the best suited. King's Improved has, in our experiments at the Iredell farm, proved to be the earliest and decidedly the most prolific variety thus far tested there, where the growing season for cotton is comparatively short.

PROPER PLACE TO SELECT SEED.

With cotton, as with any other staple crop, the place to select seed for the next year's planting is in the field—selecting with reference to total yield of seed cotton, percentage of lint, date of maturity, vigor, hardness, form and size of bolls, leaves, stalks, limbs, and resistance to disease and insect ravages. By selecting from stalks that bear a large number of bolls per stalk, the tendency will be in the progeny to give an increased yield over the average of the patch, which is the seed obtained when one waits to secure his seed at random from the gin. Another objection to securing seed from the gin in the usual way is that it is usually deferred until late in the fall,

and thereby, generally, seed from the last picking are obtained, which are not the best seed. The best seed, as a rule, are from the middle picking.

In selecting a variety one must not be guided entirely by total yield of seed cotton, for often between two varieties producing about the same quantity per acre, the one with the smaller yield should be chosen because of its production of a larger amount of lint and higher selling price of total products (lint and seed). It should be remembered that lint sells for from eight to fifteen times as much per pound as seed.

Other things being equal, preference should be given to the larger-bolled varieties, with a large number of locks per boll, as they are much easier picked and hence are most popular with pickers.

A few hours spent in the fall in selecting and gathering separately the seed cotton from stalks that have a large number of bolls well distributed over the stalk and with other desirable characters, will pay as well, or better, than any other form of farm work. The seed cotton thus gathered should be ginned separately and the seed carefully saved in some secure place for the next year's planting. Every one who has been through a cotton-field in the fall has surely noticed the great difference in the same field in the form, shape, and number of bolls on different stalks, as well as in the characteristics of the stalks themselves. Now, remembering that the law of heredity is as strong and constant in plants as in animals, will help to emphasize the great importance of selecting seed of the short staple cotton only from those stalks that bear the largest amount of lint cotton per stalk. Of course, this latter statement does not apply to long staple cottons in comparison with the short staple ones, for a long staple cotton may produce less lint per acre than a short staple one, yet this smaller number of pounds may sell for more on the market, on account of its higher selling price per pound.

BUYING SEED.

Seed of cotton as well as all other crops should be purchased only from the most reliable sources, for frequently seeds advertised in extravagant superlatives are inferior. It is not always the cheapest seed that are secured for the smallest outlay; nor, on the other hand, are all expensive seed of superior quality; so the only safe plan to follow is to buy from the most reliable parties. It might be said, however, that if seed are properly selected they will have to bring a good price to compensate the seedsman or grower for his extra care and expense. The seed should possess strong vitality, for seed of low vitality produce a poor stand of stunted plants that do not produce as large yields as good seed when grown under identical conditions of

soil, fertilization and cultivation. It will be remembered, however, that stunted cotton will give larger proportional yields than will corn. It is common to see cotton only a few inches high bearing one, two or more small bolls per stalk, while corn that only reaches three or four or five feet high will frequently produce not much more than a spindling stalk, small shuck and cob.

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

ANNUAL REPORT

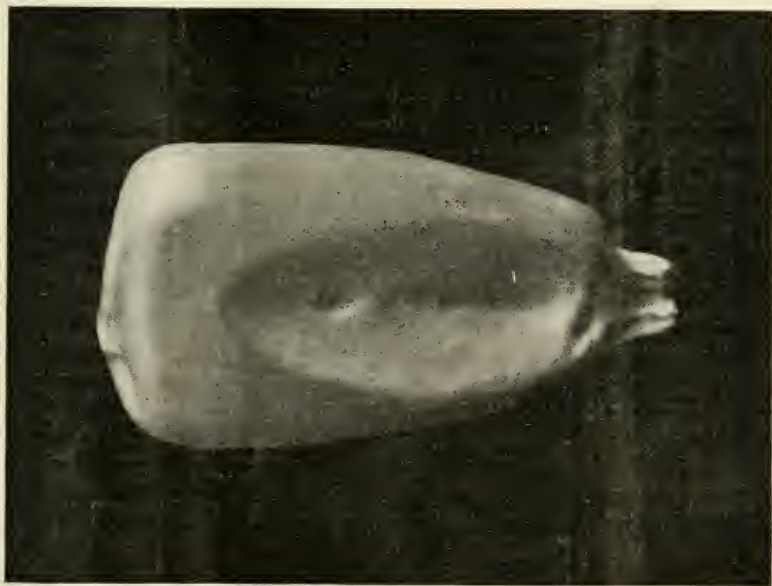
OF

FARMERS' INSTITUTES, 1906

BY

TAIT BUTLER.

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PLANT THIS SHAPE FOR LARGER YIELDS.

OCTOBER, 1906

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 10.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, OCTOBER, 1906.

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REPORT OF FARMERS' INSTITUTE WORK, 1906.

BY TAIT BUTLER, DIRECTOR.

During 1906 the State Department of Agriculture has thus far, October 1st, held 136 institutes—115 for men and 21 for women. The 115 institutes for men have been held in 91 counties—in all except Alleghany, Brunswick, Carteret, Dare, Union, and Wake. The 21 women's institutes have been held in 17 counties in the central portions of the State.

This is a considerable increase in the number of institutes ever held during any previous year, but unfortunately no record of the institute work is available except for the years 1898, 1903, 1904, 1905, and 1906. The number of institutes held during those years is as follows:

1898— 28 institutes in 27 counties.

1903— 17 institutes in 16 counties.

1904— 58 institutes in 58 counties.

1905— 79 institutes in 76 counties.

1906—136 institutes in 91 counties.

An increase of 700 per cent in the number of institutes held in 1906 over those held in 1903 might be regarded as satisfactory growth, but even the number held this year is entirely inadequate to the needs of the situation. So great is the need for the extension of agricultural knowledge and so useful and important has this educational institution, the Farmers' Institute, become all over the country, that not less than 500 institutes would be adequate to the present needs of the State. In fact, in all the thickly settled parts of the State two institutes, one for men and one for women, should be held in each township. This would necessitate the holding of about 2,000 institutes, which may be taken as a fair estimate to which the institute work in this State must grow during the next few years.

WOMEN'S INSTITUTES.

In certain sections, notably the Province of Ontario, Canada, institutes similar in purpose to those for the men have also been held for the women in the farm homes.

Owing to our social ideas and customs, there is probably no place which has been less influenced by modern discovery and the recent advance in scientific knowledge than has the Southern home, and it is therefore not surprising that these institutes for the benefit of the farmers' wives and daughters have received little attention in the South. This State is probably the first to inaugurate the movement

which is destined to do much for the women on the farms and for the improvement of the rural homes of the South.

Many obstacles and much discouraging indifference was expected and met with in starting this work, but on the whole the results were not entirely unsatisfactory. Any one who has visited the rural homes knows that much improvement is needed, and quite within reach with the facilities already existing or easily obtainable.

No one any longer questions the good done by the Farmers' Institutes for the men on the farms, and knowing that there is just as much need for and as great opportunities for improvement in the conditions existing in the farm homes of the State, no further reason need be given for the inauguration of this work. The spirit of conservatism that looked upon these women's institutes as too great an innovation, nor yet the indifference of many of the women on the farms, was the chief difficulty in the way of holding successful meetings. The great obstacle to success with these institutes, as with those for men, is the difficulty in finding suitable lecturers. Southern women are not much given to talking in public, even exclusively to their own sex, and have given still less attention to a scientific study of domestic science. But it seemed desirable that these institute lecturers have that familiarity with local conditions and customs which could only be acquired by a long residence among those to whom they were to talk.

After failing to secure the services of a native North Carolina woman to discuss domestic science subjects at these institutes, Miss Mae Card, a graduate of the Domestic Science Department of the Ontario Agricultural College, Guelph, Canada, was employed for this work. For the work of organization and to discuss general subjects relating to rural home improvement, the services of Miss Viola Boddie, a native of Nash County and a member of the faculty of the State Normal and Industrial College for women, at Greensboro, was secured. These two women were assisted by men from the force of lecturers attending the regular Farmers' Institute at the same place on the same day. The men who talked at the Women's Institutes discussed such subjects as "Farm Dairying," "Farm Poultry," "Fruit and Vegetable Gardens," etc.

From July 14 to August 11, twenty-one of these Women's Institutes were held. A reference to page 15 will show where they were held and the speakers at each. The average attendance was 83, which, considering all the circumstances, is not by any means discouraging. At several of these institutes the attendance was extremely small, but those present usually became interested and the prospects are bright for good meetings in practically all these localities next year.

The services of Miss Card will probably be retained permanently, while it is also expected that Miss Boddie will assist in the work

again next year. At least two other women will also probably be secured and forty or fifty institutes held.

COUNTY OR LOCAL ORGANIZATIONS.

Farmers' Institute organizations or committees have been organized in 93 counties of the State—all except Brunswick, Carteret, Dare, and Gates—and in several counties like Mecklenburg, Iredell, Catawba, Forsyth, Rockingham, and Rowan, where more than one institute is held, there have also been formed local institute committees. The number of committees now organized is 102 for men and 21 for women. In many cases these local committees do good and effective work, but too frequently they do absolutely nothing, or leave all that is done to the chairman. A good chairman can do much alone and can usually secure the help of some of his committee, but when the chairman lacks interest, energy, or ability to do the work required, the institute always suffers. Whereas, on the other hand, when the committee is alive to the work and has a good chairman, a good institute is always insured regardless of season of the year, weather, or location. Owing to the fact that some committeemen, and especially chairmen of committees, do not seem to understand their duties, while others are careless, the following statement of the duties of county or local institute committeemen may not be out of place:

1. It is the duty of the chairman to call his committee together at least two or three times during the year, to plan for the annual institute by arranging program, location, date, etc., and it is the duty of committeemen to attend these meetings.

2. It is the duty of every committeeman to advertise the institute, especially in his own township, by talking it up and urging all to attend. This effort should continue from the close of one institute to the beginning of the next.

3. Each committeeman should promptly post or distribute all advertising matter sent him.

4. Each chairman of a committee should promptly answer all letters written him by the State Director, regarding institute work.

5. The committee should see that the hall or place of meeting is in proper condition for the meeting, prior to the time of opening the institute. In winter fires should be built early enough to have the hall comfortable, and in summer the hall should be open and clean. It should not be necessary for the speakers to hunt up some one to open the hall and build fires, nor to do this themselves.

6. Every committeeman should endeavor to find some one able and willing to talk instructively at these institutes so as to reduce the number of State speakers necessary, thereby making it possible to hold more institutes at the same total cost.

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Alamance -----	W. H. Turrentine -----	Burlington.
Alexander -----	J. N. Smith -----	Taylorsville.
Alleghany -----	S. F. Thompson -----	Sparta.
Anson -----	Dr. W. J. McLendon -----	Wadesboro.
Ashe -----	John Dent -----	Jefferson.
Beaufort -----	W. D. Grimes -----	Washington.
Bertie -----	C. W. Spruill -----	Quitsna.
Bladen -----	R. B. Cromartie -----	Elizabethtown.
Brunswick -----	No Committee -----	
Buncombe -----	C. P. Weaver -----	Alexander.
Burke -----	J. E. Coulter -----	Connelly Springs.
Cabarrus -----	J. P. Allison -----	Concord.
Caldwell -----	George Goforth -----	Lenoir.
Camden -----	W. G. Ferebee -----	Gregory.
Carteret -----	No Committee -----	
Caswell -----	B. S. Graves -----	Yanceyville.
Catawba -----	W. J. Shuford -----	Hickory.
Catawba -----	C. E. Smyre -----	Newton.
Chatham -----	W. B. Wilson -----	Ebenezer.
Cherokee -----	W. P. Walker -----	Andrews.
Chowan -----	M. Makely -----	Edenton.
Clay -----	J. A. Pentland -----	Hayesville.
Cleveland -----	J. T. Gardner -----	Shelby.
Columbus -----	Ira Lennon -----	Whiteville.
Craven -----	J. M. Spencer -----	New Bern.
Cumberland -----	J. B. Husk -----	Fayetteville.
Currituck -----	J. J. Morse -----	Moyock.
Dare -----	No Committee -----	
Davidson -----	P. J. Leonard -----	Lexington.
Davie -----	S. A. Woodruff -----	Mocksville.
Duplin -----	R. J. Williams -----	Warsaw.
Durham -----	P. H. Massey -----	Durham.
Edgecombe -----	G. A. Holderness (at large) -----	Tarboro.
Edgecombe -----	J. O. W. Gravely (local) -----	Rocky Mount.
Forsyth -----	A. B. Atwood (at large) -----	Winston-Salem.
Forsyth -----	Luther Strupe (Rural Hall) -----	Tobaccoville.
Franklin -----	T. B. Wilder -----	Louisburg.
Gaston -----	C. F. Smith -----	Stanley.
Gates -----	No Committee -----	

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Graham -----	G. B. Walker -----	Robbinsville.
Granville -----	W. T. Allen -----	Oxford.
Greene -----	W. A. Darden -----	Ayden.
Guilford -----	J. Franklin Davis -----	Guilford College.
Halifax -----	W. T. Eure -----	Halifax.
Harnett -----	C. McArtan -----	Lillington.
Haywood -----	Dr. G. D. Green -----	Waynesville.
Henderson -----	P. F. Patton -----	Hendersonville.
Hertford -----	W. P. Shaw -----	Winton.
Hyde -----	Charles Brim -----	Swan Quarter.
Iredell -----	T. J. Allison (at large) -----	Statesville.
Iredell -----	S. A. Lowrance -----	Mooresville.
Jackson -----	G. P. Miller -----	Sylva.
Johnston -----	W. M. Sanders -----	Smithfield.
Jones -----	J. C. Parker -----	Oliver.
Lenoir -----	G. F. Loftin -----	Kinston.
Lincoln -----	H. D. Warlick -----	Reepsville.
McDowell -----	Dr. R. J. Burgin -----	Marion.
Macon -----	Walter E. Deal -----	Franklin.
Madison -----	J. R. Sams -----	Mars Hill.
Martin -----	Dr. John D. Biggs -----	Williamston.
Mecklenburg -----	C. C. Moore (at large) -----	Charlotte.
Mecklenburg -----	J. W. Potts (local) -----	Pineville.
Mecklenburg -----	N. S. Alexander (local) -----	Charlotte.
Mecklenburg -----	William Caldwell (local) -----	Huntersville.
Mitchell -----	S. M. C. Green -----	Toecane.
Montgomery -----	C. C. Wade -----	Troy.
Moore -----	H. C. Dowd -----	Carthage.
Nash -----	W. E. Jeffrey -----	Rocky Mount.
New Hanover -----	George W. Trask -----	Wilmington.
Northampton -----	R. W. Fleetwood -----	Jackson.
Onslow -----	James Grant -----	Sneeds Ferry.
Orange -----	S. W. Andrews -----	Hillsboro.
Pamlico -----	W. H. Sawyer -----	Bayboro.
Pasquotank -----	R. Nixon Morgan -----	Elizabeth City.
Pender -----	W. M. Hand -----	Burgaw.
Perquimans -----	David Cox -----	Hertford.
Person -----	J. A. Long -----	Roxboro.
Pitt -----	O. L. Joyner -----	Greenville.

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Polk -----	T. T. Ballinger -----	Tryon.
Randolph -----	John F. Beeson -----	Randleman.
Richmond -----	W. E. Crossland -----	Rockingham.
Robeson -----	E. F. McRae -----	Maxton.
Rockingham -----	J. V. Price (at large) -----	Wentworth.
Rockingham -----	J. Robert Garrett (local) -----	Thompsonville.
Rowan -----	B. B. Miller (at large) -----	Salisbury.
Rowan -----	B. S. Brown (local) -----	China Grove.
Rutherford -----	W. K. McDowell -----	Island Ford.
Sampson -----	S. H. Hobbs -----	Clinton.
Scotland -----	R. E. Warwick -----	Sneeds Grove.
Stanly -----	John T. Dunlap -----	Norwood.
Stokes -----	I. G. Ross -----	Walnut Cove.
Surry -----	S. C. Franklin -----	Mount Airy.
Swain -----	S. W. Black -----	Bryson City.
Transylvania -----	G. W. Wilson -----	Davidsons River.
Tyrrell -----	T. L. Jones -----	Columbia.
Union -----	T. J. W. Broom -----	Monroe.
Vance -----	T. P. Stewart -----	Henderson.
Wake -----		
Warren -----	H. T. Macon -----	Warrenton.
Washington -----	T. W. Blount -----	Roper.
Watauga -----	T. C. Baird -----	Valle Cruces.
Wayne -----	H. D. Ham -----	Goldsboro.
Wilkes -----	J. G. Hackett -----	North Wilkesboro.
Wilson -----	Walter F. Woodard -----	Wilson.
Yadkin -----	W. S. Gough -----	Hamptonville.
Yancey -----	S. W. Blalock -----	Burnsville.

WOMEN'S LOCAL ORGANIZATIONS.

At each place where an institute was held an organization was secured very similar to that used for the Farmers' Institutes.

A committee was appointed which usually included representatives distributed over the whole county. The aim was to select women who would take an active interest. Their duties are much the same as those enumerated for the regular Farmers' Institute committees on page 6.

The following is a list of the chairmen of these committees and their post-office address:

CHAIRMEN COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Alamance -----	Mrs. R. W. Scott -----	Melville.
Anson -----	Mrs. J. G. Boylin -----	Wadesboro.
Catawba -----	Mrs. W. H. Nicholson (Hickory) -----	Hickory.
Catawba -----	Miss Ann Yoder (Newton) -----	Hickory, R. F. D. 1.
Chatham -----	Mrs. Rom. Eubanks -----	Pittsboro.
Cumberland -----	Mrs. M. Maxwell -----	Fayetteville, R. F. D. 2.
Durham -----	Mrs. P. H. Massey -----	Durham, R. F. D. 3.
Gaston -----	Miss Mabel Bulwinkle -----	Dallas.
Iredell -----	Miss Sallie Sharp -----	Statesville.
Johnston -----	Mrs. D. J. Wellons -----	Smithfield, R. F. D. 1.
Lincoln -----	Mrs. J. R. Warlick -----	Reepsville.
Mecklenburg -----	Mrs. B. T. Price (at large) -----	Charlotte, R. F. D.
Mecklenburg -----	Mrs. Ferry Pegram (Shopton) -----	Charlotte, R. F. D. 12.
Mecklenburg -----	Mrs. Z. W. S. Tayloe (Hickory Grove) -----	Charlotte, R. F. D. 9.
Mecklenburg -----	Mrs. Dr. Abernethy (Alexander Academy) -----	Charlotte, R. F. D. 2.
Orange -----	Mrs. T. B. Parker -----	Hillsboro.
Richmond -----	Mrs. J. A. Harrington -----	Rockingham, R. F. D. 1.
Robeson -----	Mrs. R. N. Williams (Maxton) -----	Maxton.
Robeson -----	Mrs. W. K. Culbreth (Lumberton) -----	Lumberton, R. F. D. 6.
Rockingham -----	Mrs. J. D. Meador -----	Stoneville, R. F. D. 1.
Scotland -----	Mrs. J. C. Hodges -----	Laurinburg, R. F. D. 2.
Stokes -----	Miss D. B. Petree -----	King, R. F. D. 1.
Wake -----		

FARMERS' INSTITUTES HELD 1906 AND STATE SPEAKERS ATTENDING.

Date.	County.	Location.	Speakers Furnished by State.
Aug. 7	Alamance-----	R. W. Scott's Farm, Melville.	Parker, Butler, Meacham, Kendall.
July 25	Alexander -----	Taylorsville -----	McLendon, Reimer.
July 30	Anson -----	Wadesboro -----	Hume, McLendon, Butler, Kendall, Jeffrey.
July 26	Ashe-----	Jefferson-----	Parker, Scott, Butler.
Jan. 11	Beaufort-----	Washington-----	Hume, Parker.
Jan. 29	Bertie-----	Windsor-----	Hume, Parker.
Jan. 20	Bladen-----	Elizabethtown -----	Butler, Reimer.
Aug. 28	Buncombe -----	Hemphill Church-----	Scott, Reimer, French.
July 21	Burke-----	Morganton -----	Butler, McLendon, Reimer, Harris.
July 18	Cabarrus-----	Concord -----	Sherman, Parker, Harris.
July 23	Caldwell -----	Lenoir-----	Scott, Parker, Reimer, Butler.
Jan. 22	Camden-----	Camden -----	Hume, Parker.
Jan. 16	Caswell -----	Leasburg-----	Hume, Conner, Roberts.
Jan. 17	Caswell -----	Yanceyville-----	Hume, Conner, Roberts.
Jan. 25	Catawba -----	Hickory -----	Hume, Meacham, Jeffrey.
Jan. 26	Catawba -----	Newton -----	Hume, Meacham, McLendon, Jeffrey.
July 14	Chatham-----	Pittsboro-----	Butler, McLendon, Jeffrey, Kendall.
Aug. 24	Cherokee-----	Andrews -----	Stevens, Reimer, French, Scott.
Jan. 25	Chowan-----	Edenton-----	Hume, Parker.
Aug. 25	Clay -----	Hayesville-----	Stevens, French, Scott.
Aug. 19	Cleveland -----	Shelby -----	McLendon, Butler, Harris.
Jan. 22	Columbus-----	Whiteville-----	Butler, Williams.
Jan. 16	Craven-----	New Bern-----	Butler, Williams.
Aug. 11	Cumberland -----	Fayetteville -----	Hume, Sherman, Jeffrey, Kendall.
Jan. 20	Currituck-----	Currituck -----	Hume, Parker.
July 21	Davidson-----	Lexington-----	Hume, Sherman, Jeffrey.
Aug. 4	Davie -----	Mocksville-----	Butler, Parker.
Jan. 18	Duplin-----	Kenansville -----	Butler, Williams, Porter.
Aug. 7	Duplin-----	Kenansville -----	Hume, McLendon, Sherman.
Aug. 8	Durham-----	T. N. Allen's Farm-----	Butler, Parker, Kendall.
Aug. 1	Edgecombe -----	Test Farm-----	Sherman, Conner, Browne, Roberts.
Jan. 10	Edgecombe-----	Tarboro -----	Hume, Parker.
Aug. 6	Forsyth-----	Winston-Salem-----	Butler, Kendall, Parker.
July 31	Forsyth-----	Rural Hall -----	Butler, Scott, Parker, Meacham.
July 25	Franklin-----	Louisburg -----	Sherman, Conner, Roberts.
July 28	Gaston-----	Dallas -----	Hume, McLendon, Jeffrey, Kendall.
Jan. 26	Gates-----	Gatesville -----	Hume, Parker.
July 30	Gates-----	Gatesville -----	Sherman, Conner, Browne, Roberts.
Aug. 23	Graham-----	Robbinsville-----	Stevens, Reimer, Scott, French.

FARMERS' INSTITUTES HELD 1906 AND STATE SPEAKERS ATTENDING.

Date.	County.	Location.	Speakers Furnished by State.
July 23	Granville-----	Oxford -----	Sherman, Conner, Roberts.
Jan. 8	Greene-----	Snow Hill -----	Butler, Williams.
Aug. 11	Greene-----	Snow Hill -----	Butler, McLendon, Williams.
July 20	Guilford -----	Guilford College-----	Sherman, Parker, Kendall, Moore.
Jan. 9	Halifax -----	Halifax-----	Hume, Parker.
July 28	Halifax -----	Halifax-----	Sherman, Roberts, Conner.
Aug. 10	Harnett-----	Lillington -----	Hume, Sherman, Kendall.
Aug. 18	Haywood -----	Waynesville -----	Stevens, Reimer, Scott, French.
Aug. 15	Henderson -----	Hendersonville -----	Stevens, Reimer, Scott, French.
Jan. 27	Hertford -----	Winton-----	Hume, Parker.
July 31	Hertford-----	Winton-----	Sherman, Conner, Browne, Roberts.
Jan. 13	Hyde-----	Swan Quarter -----	Hume, Parker.
July 24	Iredell -----	Test Farm-----	Hume, McLendon, Reimer.
Aug. 1	Iredell -----	Mooresville-----	Butler, Parker, Scott.
Aug. 21	Jackson-----	Webster-----	Stevens, Reimer, Scott, French.
Aug. 9	Johnston-----	Smithfield -----	Hume, Sherman, Jeffrey, Kendall.
Jan. 17	Jones -----	Trenton -----	Butler, Williams.
Jan. 5	Lenoir -----	Kinston -----	Butler, Stevens.
July 27	Lincoln -----	Lincolnton -----	Hume, McLendon, Jeffrey, Kendall.
Aug. 14	McDowell-----	Marion -----	Stevens, Scott, French.
Aug. 20	Macon -----	Franklin -----	Stevens, Scott, French, Reimer.
Aug. 27	Madison -----	Marshall -----	Stevens, Scott, Reimer, French.
Jan. 16	Martin -----	Williamston-----	Hume, Parker.
July 16	Mecklenburg-----	Shopton -----	Sherman, Parker, Jeffrey, Kendall, Harris.
July 17	Mecklenburg-----	Hickory Grove-----	Butler, McLendon, Davis, Jeffrey.
July 18	Mecklenburg-----	Alexander Academy--	Butler, McLendon, Davis.
Aug. 31	Mitchell-----	Bakersville-----	Reimer, Scott, French.
July 13	Montgomery-----	Troy-----	Sherman, Parker, Reimer.
July 16	Moore-----	Carthage-----	Butler, McLendon, Davis.
Jan. 10	Nash-----	Nashville-----	Butler, Williams, Pace.
Aug. 2	Nash-----	Nashville-----	Sherman, Conner, Browne.
Jan. 19	New Hanover-----	Wilmington -----	Butler, Reimer, Porter.
Jan. 8	Northampton-----	Jackson -----	Hume, Parker.
July 27	Northampton-----	Jackson -----	Sherman, Conner, Roberts.
Jan. 15	Onslow -----	Jacksonville-----	Butler, Williams.
July 21	Orange -----	Occonechee Farm ---	Parker, Scott, Conner.
Jan. 13	Pamlico-----	Bayboro -----	Butler, Williams.
Jan. 23	Pasquotank-----	Elizabeth City-----	Hume, Parker.
Jan. 23	Pender-----	Burgaw -----	Butler, Williams, Porter.

FARMERS' INSTITUTES HELD 1906 AND STATE SPEAKERS ATTENDING.

Date.	County.	Location.	Speakers Furnished by State.
Aug. 6	Pender-----	Burgaw -----	Hume, Sherman, McLendon.
Jan. 24	Perquimans-----	Hertford -----	Hume, Parker.
July 14	Person -----	Roxboro -----	Hume, Conner, Roberts.
Jan. 6	Pitt -----	Greenville-----	Butler, Stevens.
Aug. 10	Pitt -----	Greenville-----	Butler, McLendon, Williams.
Aug. 17	Polk -----	Columbus -----	Stevens, Reimer, Scott, French.
July 14	Randolph -----	Ashboro -----	Sherman, Parker, Davis.
July 31	Richmond-----	Rockingham-----	Hume, McLendon, Jeffrey, Kendall.
Aug. 2	Robeson -----	Maxton-----	Hume, McLendon, Williams, Kendall.
Aug. 4	Robeson -----	Lumberton -----	Hume, McLendon, Williams, Kendall.
July 18	Rockingham -----	Lenox Castle -----	Hume, Conner, Roberts.
July 19	Rockingham -----	Sharp Institute -----	Hume, Scott, Jeffrey, Kendall.
July 17	Rowan -----	China Grove-----	Sherman, Parker, Kendall.
July 19	Rowan -----	Salisbury -----	Sherman, Moore, Conner, Davis.
July 20	Rutherford -----	Rutherfordton -----	Butler, McLendon, Harris.
Aug. 4	Sampson-----	Clinton -----	Sherman, Conner.
Jan. 4	Sampson-----	Clinton -----	Butler, Jefferies.
Aug. 1	Scotland -----	Laurinburg -----	Hume, McLendon, Williams, Kendall.
July 23	Stanly -----	Albemarle-----	Hume, McLendon.
July 20	Stokes -----	Danbury -----	Hume, Scott, Jeffrey.
July 30	Surry -----	Dobson -----	Parker, Scott, Meacham.
Aug. 22	Swain-----	Bryson City -----	Stevens, Reimer, Scott, French.
Aug. 16	Transylvania -----	Brevard -----	Stevens, Scott, French, Reimer.
Jan. 18	Tyrrell-----	Columbia -----	Hume, Parker.
July 24	Vance-----	Henderson -----	Sherman, Conner, Roberts.
Jan. 6	Warren -----	Warrenton -----	Hume, Parker.
July 26	Warren -----	Warrenton -----	Sherman, Conner, Roberts.
Jan. 15	Washington -----	Roper -----	Hume, Parker.
July 24	Watauga-----	Boone -----	Butler, Parker, Scott.
Jan. 11	Wayne -----	Goldsboro -----	Butler, Williams, Porter.
Aug. 8	Wayne -----	Salem Church -----	Hume, Sherman, McLendon.
July 28	Wilkes -----	Wilkesboro -----	Butler, Parker, Scott.
Jan. 9	Wilson -----	Wilson -----	Butler, Williams.
Aug. 3	Wilson -----	Wilson -----	Sherman, Conner, Browne.
Aug. 3	Yadkin-----	Yadkinville-----	Butler, Parker.
Aug. 30	Yancey -----	Burnsville-----	Reimer, Scott, French.

FARMERS' INSTITUTE SPEAKERS AND SUBJECTS, 1906.

LECTURER.	Number Institutes Attended.	SUBJECTS.
H. H. HUME ----- State Horticulturist.	41	Soil Improvement. The Farmer's Vegetable Garden. The Farmer's Fruit Garden.
TAIT BUTLER -----	37	How Shall We Use Our Corn Stover and Cotton Seed to Get the Most Out of Them? Crop Rotation. How to Eradicate The Cattle Fever Ticks. Problems in Beef Production. Hog Cholera.
T. B. PARKER ----- Farmer.	34	Corn Culture. Alfalfa and Other Legumes. Commercial Fertilizers and How to Use Them.
FRANKLIN SHERMAN, JR. ----- Entomologist.	26	Insect Pests.
R. W. SCOTT ----- Farmer.	25	Soil Improvement by Rotation of Crops. Corn Culture.
W. J. MCLENDON ----- Farmer.	23	Cotton Culture.
F. C. REIMER ----- Horticulturist.	20	Soil Improvement. Apple Culture. Home Fruit Garden. Home Mixing of Fertilizers.
C. M. CONNER ----- Professor of Agriculture.	18	Commercial Fertilizers. The Cultivation of Crops.
J. S. JEFFREY ----- Poultryman.	14	Farm Poultry.
J. C. KENDALL ----- Dairyman.	18	Farm Dairying.
A. L. FRENCH ----- Stock Breeder.	15	The Silo and Silage. Problems in Stock-Raising.
F. L. STEVENS -----	14	Plant Diseases.
G. A. ROBERTS ----- Veterinarian.	13	Common Diseases of Live-Stock. Care and Feeding of Farm-Work Stock.
C. B. WILLIAMS ----- Agronomist.	16	The Improvement of Corn and Cotton by Seed Selection.
F. T. MEACHAM ----- Superintendent Iredell Test Farm.	5	Wheat Culture.
T. E. BROWNE -----	5	Peanut Culture.
J. FRANKLIN DAVIS -----	5	Alfalfa. Feeding the Farmer's Cow.
C. D. HARRIS ----- Inspector of Feeds.	4	Commercial Stock Feeds and Their Adul- teration.
DR. E. PORTER ----- Truck Farmer.	4	The Preparation of the Land for Truck Crops.
C. C. MOORE ----- Dairyman.	2	Forage for Stock Feeding.
JOHN H. JEFFERIES ----- Superintendent Pender Test Farm.	1	The Mixing of Fertilizers for Truck Crops.

WOMEN'S INSTITUTES, 1906, AND SPEAKERS ATTENDING.

Date.	County.	Location.	Speakers Furnished by the State.
July 14---	Chatham -----	Pittsboro -----	Miss Card, Miss Boddie, Kendall, Butler.
July 16---	Mecklenburg -----	Shopton -----	Miss Card, Miss Boddie, Kendall, Jeffrey.
July 17---	Mecklenburg -----	Hickory Grove -----	Miss Card, Miss Boddie, Davis, Butler, Jeffrey.
July 18---	Mecklenburg -----	Alexander Academy--	Miss Card, Davis, Butler.
July 19---	Rockingham -----	Sharp Institute-----	Miss Boddie, Hume, Jeffrey, Kendall.
July 20---	Stokes -----	Danbury -----	Miss Card, Hume, Jeffrey.
July 21---	Orange -----	Occoneechee Farm--	Miss Boddie, Scott.
July 24---	Iredell -----	Test Farm -----	Miss Boddie, Miss Card, Reimer.
July 25---	Catawba -----	Hickory -----	Miss Boddie, Miss Card, Hume, Jeffrey.
July 26---	Catawba -----	Newton -----	Miss Boddie, Miss Card, Hume, Jeffrey.
July 27---	Lincoln -----	Lincolnton -----	Miss Boddie, Miss Card, Kendall, Jeffrey, Meacham.
July 28---	Gaston -----	Dallas -----	Miss Boddie, Miss Card, Kendall, Jeffrey.
July 30---	Anson -----	Wadesboro -----	Miss Boddie, Miss Card, Kendall.
July 31---	Richmond -----	Rockingham -----	Miss Boddie, Miss Card, Kendall, Jeffrey, Hume.
Aug. 1---	Scotland -----	Laurinburg -----	Miss Boddie, Miss Card, Kendall, Hume.
Aug. 2---	Robeson -----	Maxton -----	Miss Boddie, Miss Card, Kendall, Hume.
Aug. 4---	Robeson -----	Lumberton -----	Miss Boddie, Miss Card, Kendall, Hume.
Aug. 7---	Alamance -----	R. W. Scott's Farm--	Miss Card, Kendall, Jeffrey, Butler.
Aug. 8---	Durham -----	T. N. Allen's Farm--	Miss Card, Kendall.
Aug. 9---	Johnston -----	Smithfield -----	Miss Card, Hume, Kendall.
Aug. 11--	Cumberland -----	Fayetteville -----	Miss Card, Kendall, Jeffrey, Hume.

WOMEN'S INSTITUTE SPEAKERS AND SUBJECTS, 1906.

Lecturers.	Number Institutes Attended.	Subjects.
MISS H. MAE CARD -----	19	Home Making and Home Conveniences. Cooking Demonstrations—Meat, Bread, etc.
MISS VIOLA BODDIE -----	15	Educating the Farmers' Daughters. Literature for the Farm Home.
J. C. KENDALL -----	14	Farm Dairying.
J. S. JEFFREY -----	11	Farm Poultry.
H. H. HUME -----	10	Farm Garden. Beautifying Home Surroundings.
TAIT BUTLER -----	4	The Relation of the State Department of Agriculture to the Women's Institutes.
J. FRANKLIN DAVIS -----	2	Farm Dairying.
R. W. SCOTT -----	1	Dairying.
F. C. REIMER -----	1	Improvement of Home Grounds.
F. T. MEACHAM -----	1	The Boys on the Farms.

ATTENDANCE, 1906.

Owing to the fact that institutes were held in nearly every county in the State, and in many of which institutes have never been regularly held, it was expected that the institutes this year would not be as large as on some previous years. In a few cases inclement weather, bad roads, and other distracting influences might be taken as an excuse for the small attendance at certain institutes; but after considering all the facts it is discouraging to know that at too many of the institutes the attendance was disgracefully small, and in some cases the interest anything but satisfactory. In nearly every instance where the attendance and interest failed to come up to reasonable expectations the local or county committee was either lukewarm or entirely lacking in interest and effort. On the other hand, where there was a good active committee that coöperated with the State management, good interest and a fair attendance was insured regardless of all other conditions. In view of these facts, it has become a pertinent question whether those counties where institutes have been held annually for two or three years and the attendance or interest is still below a certain standard should not be dropped from the institute work and all efforts concentrated where most good can be done to the greatest number. In this class may be named the counties of Ashe, Burke, Caldwell, Camden, Cherokee, Durham, Forsyth, Green, Halifax, Haywood, McDowell, Randolph, Rowan, Stokes, and Vance. If these institutes are of value anywhere—and it has been demonstrated that they are—they may be made so in these counties, and we earnestly solicit the coöperation of every farmer interested in agricultural progress to join us in one last determined effort to hold good institutes in every county in the State next year. The number of institutes held and the average attendance for those years of which we have records are as follows:

	Institutes.	Average Attendance.
1898.....	28	79
1903.....	17	165
1904.....	58	147
1905.....	79	127
1906—for men.....	115	134
—for women.....	21	83

FARMERS' INSTITUTES HELD DURING 1898, 1903, 1904, 1905, AND 1906,* AND THE ATTENDANCE AT EACH.

County.	Location.	1898.	1903.	1904.	1905.	*1906.
Alamance -----	Graham -----			115	86	-----
Alamance -----	R. W. Scott's Farm -----					550
Alexander -----	Taylorsville -----	110		98	201	95
Alleghany -----	Sparta -----			48	47	-----
Alleghany -----	Laurel Springs -----				36	-----
Anson -----	Wadesboro -----		182		328	217
Ashe -----	Jefferson -----			77	51	78
Beaufort -----	Washington -----	18		282	108	123
Bertie -----	Windsor -----			171	121	101
Bladen -----	Elizabethtown -----					223
Buncombe -----	Weaverville -----				40	-----
Buncombe -----	Hemphill Church -----					118
Burke -----	Morganton -----			125	86	54
Cabarrus -----	Concord -----			401	284	247
Caldwell -----	Granite Falls -----			113		-----
Caldwell -----	Lenoir -----				101	73
Camden -----	Camden -----	20		60	68	62
Caswell -----	Yanceyville -----	16	144		88	118
Caswell -----	Leasburg -----					60
Catawba -----	Hickory -----					75
Catawba -----	Newton -----		230	116	196	115
Chatham -----	Pittsboro -----			124	124	200
Cherokee -----	Murphy -----			40	26	-----
Cherokee -----	Andrews -----					64
Chowan -----	Edenton -----	35		74	46	115
Clay -----	Hayesville -----			63	75	96
Cleveland -----	Shelby -----			320	211	309
Columbus -----	Whiteville -----					227
Craven -----	New Bern -----					57
Cumberland -----	Fayetteville -----				158	144
Currituck -----	Currituck -----			60	74	103
Davidson -----	Lexington -----			62	106	100
Davie -----	Mocksville -----		137		112	177
Davie -----	Center Camp-Ground -----			228		-----
Duplin -----	Magnolia -----	600				-----
Duplin -----	Kernersville -----					123
Duplin -----	Kernersville -----					53
Durham -----	Durham -----				46	-----

* Those held in 1906 previous to October 1.

FARMERS' INSTITUTES HELD DURING 1893, 1903, 1904, 1905,* AND 1906,* AND THE ATTENDANCE AT EACH.

County.	Location.	1898.	1903.	1904.	1905.	*1906.
Durham	T. N. Allen's Farm					40
Edgecombe	Tarboro			135	129	96
Edgecombe	State Test Farm					175
Edgecombe	Rocky Mount					300
Forsyth	Winston-Salem			126	87	94
Forsyth	Rural Hall					45
Franklin	Louisburg			150	200	125
Franklin	Franklinton		240			
Gaston	Stanley		118			
Gaston	Dallas			211	218	136
Gates	Sunbury	38				
Gates	Gatesville			191		25
Gates	Gatesville					60
Graham	Robbinsville			32	72	68
Granville	Oxford	38	160		67	94
Granville	Creedmoor			135		
Greene	Snow Hill					40
Greene	Snow Hill					68
Guilford	Guilford College	70				125
Guilford	Battle-Ground			99		
Guilford	Greensboro				183	
Halifax	Littleton		201			
Halifax	Halifax	35			115	25
Halifax	Halifax					11
Harnett	Lillington				56	48
Haywood	Waynesville			44	90	40
Henderson	Hendersonville				72	85
Hertford	Winton				98	17
Hertford	Winton					93
Hertford	Murfreesboro			134		
Hertford	Ahoskie	48				
Hyde	Swan Quarter	200				35
Iredell	Statesville		149	197		
Iredell	Mooresville					145
Iredell	State Test Farm				250	600
Jackson	Webster			61	120	63
Johnston	Smithfield				73	81
Jones	Trenton					59

* Those held in 1906 previous to October 1.

FARMERS' INSTITUTES HELD DURING 1898, 1903, 1904, 1905, AND 1906,* AND THE ATTENDANCE AT EACH.

County.	Location.	1898.	1903.	1904.	1905.	*1906.
Lenoir	Kinston				104	83
Lincoln	Lincolnton		125	102	250	225
McDowell	Marion				123	48
Macon	Franklin			65	76	75
Madison	Marshall				74	78
Madison	Mars Hill			149		
Martin	Williamston				102	100
Mecklenburg	Steele Creek		130			
Mecklenburg	Dixie			450		
Mecklenburg	Sharon				200	
Mecklenburg	Cornelius				196	
Mecklenburg	Shopton					500
Mecklenburg	Hickory Grove					600
Mecklenburg	Alexander Academy					550
Mitchell	Linnville	55				
Mitchell	Bakersville				38	52
Montgomery	Troy			184	132	82
Moore	Carthage			179	174	176
Nash	Nashville					41 63
New Hanover	Wilmington					55
Northampton	Jackson			271	121	134 92
Onslow	Richlands	85				
Onslow	Jacksonville					191
Orange	Hillsboro				43	
Orange	Occoneechee Farm					700
Pamlico	Bayboro	150				59
Pasquotank	Elizabeth City	16		114	95	121
Pender	Burgaw					87 156
Perquimans	Hertford	40		209	82	71
Person	Roxboro	55	143	53	114	150
Pitt	Greenville			225	152	113 167
Polk	Columbus				95	155
Polk	Mill Spring			250		
Randolph	Ashboro			126	85	73
Richmond	Rockingham		149		168	116
Robeson	Maxton					207
Robeson	Lumberton				167	169
Rockingham	Wentworth			100	125	

* Those held in 1906 previous to October 1.

FARMERS' INSTITUTES HELD DURING 1898, 1903, 1904, 1905, AND 1906,* AND THE ATTENDANCE AT EACH.

County.	Location.	1898.	1903.	1904.	1905.	*1906.
Rockingham-----	Sharp Institute-----	-----	375	-----	-----	75
Rockingham-----	Reidsville-----	65	137	-----	-----	-----
Rockingham-----	Lenox Castle-----	-----	-----	-----	225	173
Rowan-----	Salisbury-----	-----	-----	156	102	60
Rowan-----	China Grove-----	-----	-----	-----	-----	43
Rutherford-----	Rutherfordton-----	-----	-----	194	121	187
Sampson-----	Clinton-----	-----	-----	-----	-----	113
Scotland-----	Laurinburg-----	-----	-----	-----	136	105
Stanly-----	Albemarle-----	-----	-----	405	358	125
Stokes-----	Dalton-----	55	-----	-----	-----	-----
Stokes-----	Danbury-----	-----	-----	78	106	76
Surry-----	Dobson-----	-----	-----	45	182	147
Swain-----	Bryson City-----	-----	-----	47	82	48
Transylvania-----	Brevard-----	-----	-----	-----	30	68
Tyrrell-----	Columbia-----	60	-----	-----	-----	89
Union-----	Monroe-----	-----	145	269	223	-----
Vance-----	Henderson-----	35	142	55	76	36
Warren-----	Warrenton-----	120	-----	203	174	157 142
Washington-----	Plymouth-----	48	-----	-----	-----	-----
Washington-----	Roper-----	-----	-----	174	105	205
Watauga-----	Boone-----	18	-----	-----	129	133
Watauga-----	Blowing Rock-----	40	-----	-----	-----	-----
Watauga-----	Valle Cruces-----	-----	-----	147	-----	-----
Wayne-----	Goldsboro-----	-----	-----	-----	-----	96
Wayne-----	Salem Church-----	-----	-----	-----	-----	110
Wilkes-----	Wilkesboro-----	65	-----	52	98	126
Wilson-----	Wilson-----	-----	-----	-----	-----	17 67
Yadkin-----	Booneville-----	67	-----	-----	-----	-----
Yadkin-----	Yadkinville-----	-----	-----	-----	356	230
Yancey-----	Burnsville-----	-----	-----	141	160	86
Number of Institutes held-----	-----	28	17	58	79	115
Average attendance-----	-----	79	165	147	127	134

* Those held in 1906 previous to October 1.

SUGGESTIONS FOR FUTURE WORK.

The day and date for holding the institute must necessarily be fixed early. Three months before the time contemplated for holding the institute the State Director will send out a schedule of dates for the series of institutes to be held in a certain section of the State. If the local committee will decide promptly whether the date is satisfactory and at once notify the State Director a complete schedule can be arranged early. The local committee should not, except for very good reasons, insist on any exact day or date for its institute. All institutes cannot be held on Saturday, and it is fortunate that they cannot, for it is the worst day of the week for holding an institute. Likewise all institutes cannot be held at the exact time that would best suit every locality. In this State the only suitable periods for holding institutes are from July 20th to September 1st and from December 10th to 20th. But for the usual bad weather January would also be a satisfactory time. This means that all the institutes must be held in less than two months. To do this it is necessary that several institute parties of speakers be out at one time and that the institutes be held in circuits so as to save time and money in traveling.

If the committee replies promptly slight changes are always possible, but after the schedule is once fixed it cannot be changed, and therefore the local committee should be vigilant and exert every effort to prevent the selection of the institute date for other meetings. The local committee can do this, but the State Director cannot.

Many North Carolina newspaper editors render great aid to the institute work by their liberality in giving space to its advertisement. Others would do as well if the local committees did their duty. As soon as the date is determined upon give it to the local paper. Write out a little "news item" stating when the institute will be held and asking all farmers to keep that date open for attending this meeting. Every week from the time the date is announced until the institute is held something relating to it should appear in the local paper. The editor is usually a busy man, but if the chairman of the local committee will write out something and hand it in ready for publication, in nearly every case it will appear in next week's paper.

The local committee in suggesting or making out a program should remember that it ought not to be too long. One or two subjects well covered will result in more good than an attempt to cover the whole field of agriculture. The Department will hereafter probably not send more than two speakers to each institute. They will be specialists and able to cover thoroughly their particular work, but they cannot, in one day, cover the entire agricultural field.

Since only one day in the year is to be devoted to the study of our business in this way, all should be able to give the whole day to it. Let every one who wishes to attend devote the whole day to the insti-

tute and get to the place of meeting before 10 A. M. and remain until 4 P. M. With one hour out for dinner this only means five hours devoted to the institute. Surely we can do that much once a year. What a saving of time it would be if all would learn that 10 o'clock does not mean 11 o'clock or 11:30.

Where women's institutes have not yet been held the local Farmers' Institute Committee can and should arrange for one. These institutes for the farmers' wives and daughters will aid the regular farmers' institutes and be of great benefit to the women in the farm homes if they get all out of them that is possible.

LECTURES DELIVERED AT FARMERS' INSTITUTES.

On the following pages are several of the lectures delivered at the institutes during 1906. They are necessarily more or less condensed, and in being reduced to paper have lost much of the interest which they possessed when spoken.

PEANUT CULTURE.

BY T. E. BROWNE, HERTFORD COUNTY.

I shall endeavor to speak to you a while on the culture of peanuts, and what I shall say is based on what experience I have had and on the experience of the most successful peanut farmers of Hertford County. I live in the county (Hertford) which raises more peanuts than any other county in the State, and I believe I may say in the community which raises more than any other part of the county. The condition of the farmers in the peanut sections is 100 per cent better than before they began to raise this crop for market. I have in mind a man of my county who started out several years ago working for wages on a farm. In a short while he bought a farm on time and began raising cotton to pay for it, but with little success. A few years ago he began the culture of peanuts, and to-day he has that farm paid for and owns another nice farm. He will tell you if he had not stopped raising cotton exclusively and gone into the peanut business he never would have paid for his farm. This is only one incident, but it goes to prove that in those sections where peanuts can be grown they prove the most profitable crop; therefore we should make a study of this crop and learn all there is to be learned in regard to its cultivation and harvesting.

We first want to discuss *seed-peas*. In the physical as well as in the moral world, the kind of fruit depends on the kind of seed sown. In nothing is this more true than in peanut culture. There are several varieties of peanuts raised, the Jumbo, Virginia Bunch, the North Carolina Bunch—a variety something between the bunch and running—several varieties of running peas, and the Spanish pea. The variety we shall discuss mainly is the North Carolina Bunch. This nut is very little larger than the running or flat pea, but more uniform in size, and therefore a better seller. One strong point in favor of this variety is, it is much more easily cultivated, and larger quantities can be produced to the acre. The Jumbo produces a great bulk, but they are light; can't get much weight to the bag. The running pea will grow more successfully on really poor sandy soil and with less lime and plaster. The Spanish pea is raised quite extensively in some sections especially for hogs, and the vines mowed for hay. They will grow with very little fertilizer and lime.

What I consider the most important point to be considered in raising peanuts is the selection of the seed. So many do not pay any attention to this. They go to a pile of peanuts that sometimes have stayed in the field till January, take out what they think they will need for seed, and sell the remainder. Sometimes these will germinate and grow off thriftily, and sometimes not. This is running a risk, and we cannot afford to run this risk at such a critical stage of our crop. The success of the crop depends more than anything else on getting a stand of healthy plants from the first planting. It is seldom that replanted peanuts pay, and then we lose the time and seed. When I began farming for myself (and I hope you will excuse personal allusions). I observed closely the methods of the various farmers in selecting seed-peas, and tried the plan used by those who were most successful in getting a stand. I found out there were various ideas as to seed selection. Some said dig them and leave them lying in the field until they were dry, then put them in the house; some said select the largest plump peas

you have for seed; others said select a place where you think the peas are best, dig them a week or so before you do those you dig for market—that is, before they have fully matured—put them in small stacks and as soon as they are dry enough put them under a good shelter. It is the latter plan that I have adopted, and if the weather conditions are favorable and the soil in a good condition, I never have any trouble getting a stand. Whenever I put them in the ground the right depth, they come up. It is much better to get them housed before the stacks ever get wet; and by all means have seed-peas picked by hand. There is danger of a machine cracking the hull, if not the kernel, and the hull of a pea should not be broken till in the spring, when it is to be planted.

Some people have the idea that just so the pea will germinate and come up, that is all that is necessary. This is a very mistaken idea. There is just as much difference between a healthy strong plant and an inferior plant as there is between a healthy pig and a runt pig. (Some gentleman has said it will pay to knock a runt pig in the head and buy a good one, and I agree with him.) After I have my peas popped I go over them and assort them very carefully, taking out all those I don't think will germinate and make strong plants—the broken ones, discolored ones, and those with the germ end black or shriveled; not that they will not come up, for some of them will, but that I prefer the healthy strong plant. Last spring I took a number of these faulty peas, and halves with the germ attached to the side and planted them in the garden as an experiment. Nearly all of them came up, but they were small, frail plants, not worthy of being found in a man's field. Gentlemen, we cannot be too careful as to the selection of seed. It is so little trouble to plant well-selected seed, and such a great loss of time and money to cultivate a poor stand of inferior peanut plants.

As to the kind of soil most suitable to the peanut, there are various opinions. You will hear people say that the lighter the land the more suitable it is for peanuts; others, that a medium light soil is better; and still others say it makes very little difference. The main reason why the peanut crop and light sandy soil are associated is, that such soils will produce more to the acre in peanuts than any other crop we can plant, especially if the flat pea is planted. Peanuts raised on such soils are much whiter and prettier than those produced on a darker soil. However, my experience is that a medium light land suits peanuts best. The hulls are bright enough, the peanuts heavier, and the yield a great deal larger per acre. The best peanut farmers, or rather those who raise most to the acre, in our county, are those whose farms are of a medium soil. They will grow very well on stiff land, but they are more difficult to cultivate, and if the land is black the peas are not so bright.

It matters not what kind of land you have, unless you look carefully to the preparation of the soil for planting your peanut crop will be inferior. The more thoroughly pulverized the land is at the time of planting the better the result. It is preferable not to flush peanut land too early, so that it has to take the heavy rains of early spring. Get your land in a mellow, pulverized condition, and if you expect to use cultivators, remove all the trash and stubble possible. No man can successfully use such implements as the Jones and Cherry cultivators and Wooldard harrow if the land has wire-grass, stubble, or trash of any kind in it to any extent. So, much of the trouble of cultivating the crop can be dispensed with by thoroughly preparing the land beforehand.

In preparing for the peanut crop so many people underestimate the value of lime. Unless the land contains marl, which will take the place of lime, lime is very necessary to the successful production of peanuts. For bunch peanuts I may say it is absolutely essential. As to the best method of using lime there is very little difference, just so we get it into the land. The earlier we can get it on the land the better. If one is going to use over three or four hundred pounds to the acre it is better to broadcast it. Smaller quantities may be drilled in the row early and then at planting time run a cotton plow down the row and mix it with the soil, throwing some of it out on the sides. In no case should the fertilizer and lime be put down together in the same drill. The chemical action of the lime lessens the efficiency of the fertilizer. It is getting to be the custom in my neighborhood to drill the lime on top of the row soon after the peas are planted. The results are about as good, and the farmers are not quite so busy

just after they finish planting peanuts. Unless lime is used—especially is this true in regard to the bunch pea—the per cent of pops or faulty peas will be too great. We can get lime for about \$4 to \$5 per ton at the mills; it is cheap enough, and it pays a large per cent on the investment if we do have to haul it some distance. It is not necessary, however, to lime the same piece of land every year in succession, after the land has been well limed. A thorough liming once in two or three years is sufficient.

For the best all around results peanuts should be planted between the first and tenth of May. The per cent of heavy peas will be greater by having more time to grow. Some years late peas do very well. The most successful crop of peas I raised last year I planted in June. They required but very little work to cultivate them, they were ready for digging late, after the warmest weather was gone, consequently very few mildewed. But there were very few left in the land for hogs. I had to dig them before the late peas matured, consequently I saved the heavy peas around the *tap-root*.

The success of cultivating a peanut crop depends largely on the manner of planting. Planting time is the time to look out for the hard labor during the long hot summer days. However, the manner of planting must depend on the kind of soil we are cultivating. Bunch peas should be planted eight or ten inches apart in the drill, according to the strength of the land, and running peas ten or twelve inches. The rows should be three feet apart usually; on very fertile land they may be farther apart. However, bunch peas may be cultivated very successfully in rows two and one-half feet apart on thin, poor soil. I usually plant bunch peas in two and one-half feet rows, but if we have a rainy season, and the peanuts get grassy, there is trouble on hand. Then we need a wider middle in which to kill the grass. Some of the best peanut farmers use three-foot rows altogether.

If the land is light and we expect to cultivate our crop mostly with plows and cultivators, peanuts should be planted as near on a level as possible. This can be done by listing the land with a small wing, then dragging the rows down with a harrow. I have used the five-shovel cultivator for listing peanut land with very good results where the land is open. In this case I took off the rear shovel, and used large shovels on the middle standards, thereby making a small list. In heavy soil they have to be planted on a list, otherwise they would be troublesome to cultivate.

Many farmers make the great mistake of being stingy with seed-peas. Gentlemen, this is the poorest economy in the world. The men who plant my peas always speak of sowing them, and they are about right. As I have said before, the success of the crop depends more on getting a stand at first planting than anything else. It pays to plant a third more to the acre than the allotted quantity and get a good stand, rather than plant just the allotted quantity, which is usually half a bushel, and get three-fourths of a stand and have to replant. Replanted peas rarely ever pay. If a man expects to tend his crop with cultivators and weeders he just as well allow for some being torn up; it will surely be done. If you have them thick this does not make much difference, but when a man is running a weeder or cultivator and the stand is poor, it hurts him much worse to cut them up. I have run a weeder and cultivator a good deal myself, and I know. So be sure, gentlemen, that you put enough *good* seed in the ground the first time to get a good stand.

As to the cultivation of the crop, the method depends to a great extent on the kind of soil. On light thin soil peanuts can be cultivated with practically no hoe work, if taken in time, by the use of cultivators and weeders. On such soil it makes very little difference with the small plant if it is covered with a thin, layer of soil. As soon as the peanut comes up and the fine grass starts, we run a cultivator (Jones, Cherry, or Woolard harrow) over the field, covering up grass, and peas also, to a great extent. This can be done much more successfully if the peas are planted on a level. On stiffer, heavier soil, this cannot be depended upon, for where the land is at all hard the above-named cultivators cannot be worked successfully. Where the land is open and in good condition, the peanut weeder can be used to quite an advantage. If used in time the crop can be kept practically clean by running in several directions. One who has never used one of these weeders would be surprised at the small number of plants it destroys, especially if the teeth are kept clear of stubble.

As to the digging of peanuts, great care should be exercised in selecting the time. The crop can be greatly damaged if dug too early, and a great majority of the best peas will be lost if we wait too late. One should examine his patch carefully from time to time and as soon as those heavy peas around the tap-root begin to shed off, then is the time to begin digging. If dug earlier there will be too large a per cent of young peas near the ends of the branches that are not matured. It has about been decided that the largest per cent of good peas will be saved if the crop is dug after a few have shedded. If a few are lost in the ground hogs will get them, but if dug too early those immature peas will be lost.

The running pea does not require so much care at the time of digging. They are plowed up and shaken out with a fork, and can be stacked very rapidly; but with bunch peas it is different. In digging this variety the peas should all be turned one way, as far as possible, when shaken out, and great pains should be taken in stacking to turn the peas to the pole. It takes some time to do this, but if they are carefully stacked in this way there will be very few damaged nuts. They should be put up so the peas cannot be seen from the outside. If they are to stay in the field till late the peas saved from the blackbirds will pay for the extra time in stacking them in this way. If they are dug after frost, however, there will be very few mildews anyway.

Each pea-pole should be buried deep enough to prevent its being blown over by the storms. A little extra time and expense at this point will pay a good per cent, for it does not take many stacks of good peas to hire a man to bury well the stack-poles of a whole crop. More than half of all the peas of a stack that has been blown down and lain there in the winter weather will be lost. I use an auger made for the purpose of boring holes. It is made of three thin pieces of iron so put together as to bore a hole anywhere, it matters not how hard the ground is. This hole is made about the size of the pole and when buried in this way there is little danger of its blowing over, unless the pole breaks. Right here let me say a word in regard to the use of old poles. Frequently men consider it a saving to use poles several years, but this is a mistake; pine poles should never be used more than two years and then they should be well protected during the time they are not in use. They are apt to break off just at the ground and cause a great deal of damage to the crop.

There should always be one or two strong pieces of wood about six or eight inches long, nailed to the pole five or six inches above the ground to protect the peas from the ground, because all those that are near the earth will be damaged by the dampness. As to protecting the tops of the stacks with grass, I cannot agree with some farmers. The peas that I "capped off," as we call it, most carefully last year, had more mildews than those I only tied a vine around the pole. I do think that a piece of grass or a vine should be wrapped around the pole at the top of the stack to prevent the water entering there. And as peas should not be packed around the pole, but put up lightly, it is a good plan to go around and push down this grass after the peas settle, especially if they are to stay in the field until late.

A peanut farmer from Virginia, riding through Hertford County some time ago, said we made the mistake of making the stacks too low, and claimed that the higher the stacks the fewer the damaged peas, which theory is reasonable. We know that the lower the stack the more stacks we will have, and the more stacks we have the greater the number of exposed peas.

The pickings of the fields hold quite an important place among peanut farmers. A great quantity of pork is killed each year which is fattened principally on the peanuts left in the field after digging. If they are well cured, peanut vines after the peanuts are picked off, make an extra good winter feed. I believe they are better when the peas are picked by machine than when picked by hand, as the machine breaks the vines and blows out the dust and dirt.

Peas should be picked off just as soon as they are dry enough to shake in the hull. And if they are bringing a good price, that is the best time to sell. The longer they are kept the greater the loss. There is some objection on the part of the buyer to the machine-picked nuts, but I consider it more of an excuse to down the machines than anything else, because I have seen peanuts picked by Benthall's Improved Picker that were even prettier than those picked by hand.

In picking off peanuts we should be very careful to pick out all the sticks and trash as far as possible, so as to have good stock and then demand the best price. Last year the market for machine-picked goods was practically ruined by carelessness on the part of some farmers at picking time. In those cotton sections which went into peanut culture for the first time last year, great quantities were raised, and at a small cost per acre. They had them picked by some inferior machine which cracked a large per cent of the hulls.

CROP ROTATION.

BY TAIT BUTLER.

The intelligent and systematic rotation of crops has received too little attention in this State. A rotation too frequently practiced is to cultivate a field in some useful crop one or more years and then let it "lie out" and grow a crop of weeds for a year.

This primitive method of crop rotation may have something to recommend it, but its objectionable features far outweigh any advantages it may possess. To discredit this sort of a system of crop rotation it is only necessary to state a well-established fact, namely, that under a proper system of farming, land will improve in productive capacity and grow some useful crop each year.

That the working out of the best system of crop rotation for his lands is one of the most important subjects upon which the farmer can put much careful thought is shown by the following enumeration of some of the benefits resulting from intelligent crop rotation:

1. Crop rotation means diversification with the following resulting benefits:

(a) A complete failure and the loss of an entire season's work is rendered less likely to occur because it is rare that all crops fail the same year.

(b) It enables the farmer to supply food for his family and feed his live-stock and thereby lessen the cost of running the farm.

2. Crop rotation makes it possible to utilize labor to the best advantage by giving it constant employment, thus serving as a partial solution of the labor problem, now so troublesome to the one-crop farmer.

3. Different crops having different root systems feed to a greater or less extent on different portions or strata of the soil. For instance, cowpeas, red clover and alfalfa send their roots down deep into the subsoil and bring up mineral plant foods—phosphorus and potassium—of which they need comparatively large quantities, to be put into the top-soil when turned under or when fed to live-stock and the stable manure returned to the land.

Corn, again, sends its roots more deeply than wheat and oats, and therefore, to a certain extent, obtains its food from different portions of the soil.

Moreover, deep-rooted plants when grown on the land pierce innumerable holes in the subsoil and thereby serve as an excellent and cheap method of subsoiling.

4. Different crops take different proportions and quantities of the plant foods, nitrogen, phosphorus, and potassium, from the soil for their use while growing. For instance, clover and potatoes take more potassium than oats, while oats take more than wheat or corn. Clover also takes more phosphorus than wheat. Wheat, corn, and oats take all their nitrogen from the soil; whereas the legumes, although richer in this element, take it chiefly from the air.

The importance of avoiding the removal of proportionally larger quantities of one of these plant foods than of the others becomes apparent when it is realized that no soil is richer or more productive than indicated by the available supply of the one existing in the smallest quantity. In other words, it matters not how great a supply there may be of any two, if the other is deficient a maximum crop is impossible.

5. Lands repeatedly put in crops that receive no cultivation after seeding are apt to become weedy or foul.

6. The rotation of crops renders possible the keeping of more live-stock, and thereby prevents the sale of plant food or soil fertility.

7. Crop rotation lessens the probability and extent of damage by insects and diseases. A constant supply of suitable food is essential to the rapid increase of insect enemies, and likewise fungus and other diseases peculiar to a certain crop are increased by the growing of such a crop year after year on the same land.

8. Clean cultured crops tend to deplete the supply of humus in the soil; therefore, a proper crop rotation which tends to add humus to the soil is a most important factor in soil fertility or soil improvement in this State; for there is no other need of our soils that is so great or essential as the need of more humus.

9. Many of the lower forms of plant life produce in the media in which they grow toxic or excrementative materials which prevent their further growth or multiplication. It is thought by some that this same principle or fact applies to higher forms of plant life. That one kind of plant growing on a soil year after year produces in that soil conditions or poisons detrimental to the best growth of that kind of plant.

There are at least two main facts or rules which should receive careful consideration in adopting a system of rotation for any farm.

1. When practicable, clean cultured crops like corn, cotton, and tobacco should not follow each other in the rotation, especially on land having a tendency to wash badly.

2. A leguminous or nitrogen-gathering crop should come between each nitrogen-consuming crop, such as corn, cotton, wheat, oats, etc.

No one rotation can be given that will suit all farms nor all the lands on any one farm, but the above facts ought to show clearly the necessity for some sort of a rotation, and much study should be put on the subject by every farmer in order to put into operation the best one possible for his conditions and the needs of his lands.

The following are the rotations used by three successful farmers of this State. None would fit some farms, nor is perhaps any of them above criticism, but all have increased the productive capacity of the farms, three and fourfold, and meanwhile the owners of these farms have made money.

The first is a three-year rotation used by Dr. W. J. McLendon, of Anson County, and leaves little to be desired in the way of a rotation for a cotton farm:

A. THREE-YEAR ROTATION FOR A COTTON FARM.

First Year.	Second Year.	Third Year.
Wheat } Oats } Rye } Peas.	Cotton—Rye.	Corn—Peas.
Cotton—Rye.	Corn—Peas.	Wheat } Oats } Rye } Peas.
Corn—Peas.	Wheat } Oats } Rye } Peas.	Cotton—Rye.

The peas are sowed after the small-grain crops are harvested, while the rye is sowed in the cotton and the peas in the corn at the last working.

The second is a five-year rotation used by R. W. Scott of Alamance County. It is very faulty, in that three nitrogen-consuming crops (wheat, corn, and oats) and two nitrogen-gathering crops (clover and cowpeas) come in succession; but it has certain advantages in that the clover-sod may be broken for the cowpeas when it is too wet to cultivate the crops, and it also gives an excellent preparation for wheat, which is the chief money crop on this farm.

A FIVE-YEAR ROTATION USED ON A GRAIN AND STOCK FARM.

First Year.	Second Year.	Third Year.	Fourth Year.	Fifth Year.
Wheat.	Corn.	Oats. (Clover).	Clover.	(Clover). Peas.
Corn.	Oats. (Clover).	Clover.	(Clover). Peas.	Wheat.
Oats. (Clover).	Clover.	Clover. Peas.	Wheat.	Corn.
Clover.	(Clover). Peas.	Wheat.	Corn.	Oats. (Clover).
(Clover). Peas.	Wheat.	Corn.	Oats. (Clover).	Clover.

The third sample rotation here given is one used on tobacco lands, by W. A. Petree, a successful tobacco-grower of Stokes County.

A FOUR-YEAR ROTATION FOR TOBACCO.

First Year.	Second Year.	Third Year.	Fourth Year.
Clover.	Corn.	Tobacco.	Wheat.
Corn.	Tobacco.	Wheat.	Clover.
Tobacco.	Wheat.	Clover.	Corn.
Wheat.	Clover.	Corn.	Tobacco.

These rotations are merely given as samples that have proved of value on the farms where followed, and it is hoped they may serve as a basis for others to work on in arranging a suitable rotation for their own farms. Furthermore, we do not wish to be understood as ignoring the fact that in many instances a single crop has been grown on land, year after year, and the yield gradually increased; but such a system of farming requires more care and intelligence than is given to the average farm, and there is no question but some sort of a rotation is essential to the best success on a vast majority of North Carolina farms. In determining what that rotation shall be the farmer must be guided by the character of his soil, market conditions, and his own individual tastes, for in all cases where there is a crop or crops which any of these considerations magnify into first importance as the chief money crop, then the rotation should be especially planned to increase the yield and profits from that crop.

PROBLEMS IN STOCK-RAISING.

BY A. L. FRENCH, ROCKINGHAM COUNTY, N. C.

The importance of live-stock growing has been preached to our farmers for generations as being an honorable occupation, a pleasant and profitable means to secure a living, and to lay up something for the rainy day that is almost sure to come to all of us sooner or later. But I very much doubt if the importance of this great industry along another line—that of maintaining the fertility of our soils—has been brought as forcibly as it should be to the minds of our people engaged in agricultural pursuits. And I will say that this subject of maintaining soil fertility is the most important matter that confronts our people to-day, as our soil is the only *dependable* resource we have in the United States. It is claimed by men who have made a study of these matters that one hundred years will see the end of our coal supply. In fifty years at the present rate of consumption our iron mines will have become exhausted. Our oil and natural gas is going the same road at a rapid pace. So is it not time for our people to pause and consider how our present great and rapidly increasing population is to be employed and fed when these our great natural resources that employ millions of our people have become exhausted? Where, then, can we turn unless to the soil, our only resource that cannot be entirely exhausted by man's greed for dollars?

The history of our country proves that only where stock-growing and feeding is made one of the principal lines along which the farmers are working is the fertility of the soil maintained. Look the country over and see if this rule doesn't hold good. If this be the case, isn't it time we farmers of North Carolina were getting in line and doing our share toward the preservation of this our God-given heritage?

This live-stock subject may be divided into three sections. The first, the type of animal to which we must feed this food—if we expect to reap a profit on our labor—and the marketing of the finished product. In the matter of the food supply the pasture is of first importance, as there is no question about pasturing being by far the cheapest method which we can employ on the cheap lands of North Carolina, at least, in the summer feeding of our animals. All over the piedmont and western portions of North Carolina there are hundreds of thousands of acres of land that can be profitably utilized only for grazing purposes. That these lands are not being utilized in this way is one reason I am here to talk to you and to bring this question more forcibly to your minds.

I wish to give you an example or two of what has been done in my own neighborhood during the past five years in the utilizing of poor worn lands in grazing cattle.

An acquaintance of mine purchased a poor farm in our section some ten years ago. He employed local help for five years in the effort to *grow crops for sale*, with the result that he had several thousand dollars more invested in the farm at the end of the five years than he had in the beginning, and his bank account showed no improvement. The farm also was getting poorer. He came to me with the earnest request that I take the management of the place. I consented to do so in connection with my own business, provided I be allowed to manage the place as my judgment dictated. We made a trade, and the first thing I did was to order \$144 worth of barb-wire. With this we enclosed the part of 250 acres of the farm that was not already fenced with a rail fence. I then went to Texas and purchased sixty high-grade beef heifers, two-year-olds that were already bred to pure-bred bulls. We got them home in January. Fed them about fifty tons of corn silage, a few tons of peavine hay, and about April 1st turned them into the 250-acre pasture. This land, I will say in passing, had not produced enough above expenses to pay the taxes for five years. Well, we sold the following October 59 calves at twenty dollars each. Deducting the cost of the winter feed

the heifers had consumed (about \$125 worth), and we had left \$950 cash, clear of all expense, to pay us for the use of this 250 acres of land that cost, together with the wire fencing, about \$1,400. The heifers cost us \$36.75 each, delivered at our station, and no interest charge could be made against them, as we could have sold them at four dollars (each) above cost in the fall, after weaning the calves. So this grazing experiment netted us over 65 per cent on the cost of the land and fencing in one season. It is needless to say that this piece of land is still grazing cattle and has so improved in productive capacity that nearly two animals are being grazed now where one was grazed five years ago. On our own place we have about one hundred and twenty acres of permanent pasture. On this land we are grazing this season sixty-five head of cattle all ages, forty ewes (high-grade Shropshire), nine brood sows, and four horses are also getting their night feed. This land cost us six years ago \$1,500. We have expended on the land in grubbing up brush and building fence about \$300. So our permanent pasture stands us \$1,800. The taxes and interest on the value of this land amount to \$120 per year. Add to this our average yearly expense of about \$25 for grubbing, cutting thistles, mullens, etc., and we have a total expense of \$145 per year for grazing the equal of seventy-five or eighty head of cattle, or about \$1.80 per head. And yet people will contend that we cannot graze cattle profitably in North Carolina. Now I wish to say that we cannot expect these results from grazing *brush lots*. You will note I have made a charge of \$25 per year for keeping our pastures clean of every robber plant. This does not mean comparatively, but absolutely clean. We cannot expect to make beef, pork, mutton, or milk of bushes and briars; and, therefore, if these plants are of no use for grazing purposes, they have no place in a rightly conducted pasture. They not only take up land that should be growing grass, but also rob what grass grows in their near vicinity of its nutritive quality. So clean up the pastures and make them to produce grass only.

We next come to the matter of the winter feeds for our animals; and a principle we should not lose sight of in considering the question of winter feeds is to provide in these feeds a ration as nearly like that of first-class summer pasture as possible. To do this we must provide, first of all, for *succulence*. Nothing that can be grown in this country will equal corn silage for this purpose, as no feed of this nature can be provided in abundance as cheaply as can silage made from the corn plant. Then we must provide dry foods rich in protein to balance this ensilage ration which is rich in other food elements. All of the legumes, such as clovers, cowpeas, soja-beans, vetches, etc., are admirably adapted to fill this want in our ration, and they have the added advantage of gathering nitrogen from the air, thus aiding us in this way toward increasing the fertility of our soils. Further, we must—when we wish to finish our meat-producing animals or to provide for an increased flow of milk from our dairy animals—add some concentrated feed or feeds to the above. In North Carolina we have in corn and cotton-seed meal two as good as the world knows for this purpose.

So for maintaining any of the meat or milk-producing animals we need not go out of the State for a pound of feed of any description. This certainly should be a strong argument for more live-stock in our State, having a soil and climate that admits of growing all the feed necessary to the finishing of our animals and in the growing of the majority of these feeds adding plant food to our soils at no expense to us.

We have the feeds provided for; now how shall we combine them when placing them before our stock to secure their greatest value? For a stocker of any breed we should use only the ensilage and bulky dry feeds. For a yearling steer, about three pounds of ensilage to two of dry clover or pea-hay, feeding about 30 pounds of ensilage per day along with 20 pounds of hay. With a well-bred yearling steer of quiet disposition, free from lice, this ration will give a gain during the six winter months of 150 to 175 pounds at a cost of \$9.47 for the six months' feeding, at what our ensilage and pea-vine cost us on our farm, counting the time consumed in growing and harvesting the crop at what the mill people near our farm pay for hands and teams. This also includes interest and taxes on the land and interest on the cost of the silo, and figuring silage corn at ten tons per acre. We have in our section a good home market for what are called in

the West warmed-up cattle—just good smooth stuff, but not burdened with fat. Well-bred steers of this sort will bring from 4c. to 4½c. with us, and, I think, over the most of the State. These steers are fed with us on the ration I have named above, simply well-cured corn silage and pea-hay, and pay a good profit when so fed. For wintering stock cattle to be finished on grass for export the following summer, nothing can excel this ration, as by its use the animal is kept sappy and growing right along.

To finish steers for the better markets it is necessary to add to this ration for yearling steers about 6 pounds of corn and 2 pounds of cotton-seed meal per day. This ration when fed to well-cared-for cattle will be found to give good results, and no ration can be fed that is any cheaper. If for any reason the ensilage is not available, cut or shredded corn stover that has been *thoroughly dampened* twenty-four hours before using may be substituted, in which case an additional amount of grain, 2 to 3 pounds per day, will be necessary.

The winter lamb and the early spring lamb should be produced much more abundantly in Western North Carolina than is being done at present. A good flock of high-grade mutton ewes will pay all the way from 80 to 200 per cent profit on their cost each year. There is an unlimited demand for choice lambs in all of our large towns and cities at from four dollars to nine dollars each at from 60 to 80 days old; and the wool the ewe shears will nearly pay for her keep for the year. We count our little flock of ewes as one of our most profitable lines. But I would warn against the purchase of large flocks, as disease and death are almost sure to follow when large numbers of sheep are maintained. A small flock of excellent quality on each farm is the correct thing, to our way of thinking.

We come now to the type of animal we must employ in these days if we would secure the greatest profit on our breeding and feeding operations. And I want to say first of all, that any male animal to head a flock or herd should and must be pure-bred, and ought by all means to be registered, as you are reasonably sure of getting a pure-bred animal if he be registered. In the other case, you have no safeguard except the word of the man who sells you the animal. Pedigree has been a great bugbear to many farmers. There is nothing strange about it: a pedigree is only a record of the achievements of an animal and all of his ancestors to five or more generations. So if we have a well-bred animal, as we call it, we have simply an animal whose pedigree shows him to have descended from a long line of *fine individual* animals, and in using him we have a reasonable expectation that he will perpetuate in his offspring his good qualities or those of his ancestors, as "like begets like or the likeness of some ancestor." In the use of a grade or scrub sire we have no knowledge of what his ancestors were, and hence it is only a gamble as to what his produce will be.

Man's conception of what is a profitable meat-producing type of animal changes as knowledge of what the consumer wants increases. A few years ago the large, rough, upstanding animal was held in high esteem; but the consumer found that in the purchase of animals of this type he was paying his money for a lot of rough material that he could not use as food or was not such food as his taste craved. The feeder, too, found that this was not the most profitable animal for him to purchase, animals of this type consuming too much feed for a given amount of gain. So the type of meat-producing animal has been gradually changing to the more compact, blocky, smooth, short-leg, medium size. This is to-day the type that is bringing the highest price per pound on all the best markets. This applies to all manner of meat-producing animals—the steer, the hog, and the sheep or lamb. The sire is, of course, the foundation and our main dependence in working toward a given type, so it is of the greatest importance that in the sire we secure to head our flocks or herds we obtain as near the perfect type as possible. Of course, where our aim is to produce grade animals for the open market we cannot afford to purchase very high-priced males, but we should see to it that our sire is strong in all *essential* points. He should have a broad blocky head, as this is one of the indications of an easy feeding animal. His legs should be short, his back broad, and he should carry this breadth all the way back. Then if he have a deep well-filled hindquarter he will stand a pretty good chance to produce these essential qualities in his offspring, provided he is, as

I have said before, the descendant of a long line of this same type of animal. About three-fourths of the value of a meat-producing carcass (as priced on our best markets) is in the meat produced on the back and in the hindquarter; so you can readily see how important it is that the sire should be very strong in these two points.

I have time to touch only on the marketing of our stock. Some will find it profitable to produce feeders for others located in more favorable sections for grain production. Others with a large proportion of arable land will be able to finish their animals for the better markets, in which case the animals must be produced in car-load lots and then sent where they will bring their value. Early lambs and hogs can usually be disposed of in our own near-by cities and towns by having them ready to sell at the time the people want that class of meat. Each man must study his market; and remember this, that a first-class product can always be sold somewhere at a profit.

THE SILO FOR THE STOCKMAN AND SMALL DAIRYMAN.

By J. FRANKLIN DAVIS, GUILFORD COLLEGE, N. C.

There are comparatively few silos in North Carolina, and these are almost exclusively owned by the larger dairymen. There will be many more built this fall, but relatively few of those who do something in the dairy line have yet realized what the silo means for them. So few have ever seen good silage that even if they have read about the silo, they have an indefinite idea of what it really means, either as a matter of convenience or as a matter of economy. I have never yet seen a dairyman who has tried feeding silage who would think of keeping milking cows through the winter without it. The best dairyman in my neighborhood built a silo last fall, and now he says he does not see how he got along so long without one. There had been silos in the community, but to him it still seemed something of an experiment. The cost of building loomed up before him; he had been too busy to give much attention to the success of his neighbors; and the prospect of losing his feed kept him in dread. But one season's experience showed him that a silo is a necessity. No dairyman can afford to do without silage for winter feed. And the same may be said of the farmer who feeds beef cattle, and raises his own feed (and if he does not he cannot afford to feed them).

In the first place, one can get more feed-stuff from a given piece of land in corn than in anything else. On good land in a favorable season one may get, at very little expense, from ten to twenty tons of the best feed per acre planted in corn and peas, or sorghum and peas.

Now the silo is the means for saving every pound of this vast amount of feed in the best manner. A good home-made small stave silo may be made by any farmer who can use tools, or by a common carpenter, at a cost of from twenty-five to fifty dollars; or if a farmer is full-handed, and wishes to make the silo a permanent improvement on his farm, he may get one of the ready-made small silos with patent doorway and cover for from \$75 to \$100. The first silo I built was put up by myself and sixteen-year-old boy in one day, and did not cost over ten dollars—a small one, to be sure, 7 feet in diameter and 12 feet high. I should not again build one so small; but that was something of an experiment. By elevating the cutter to a level with the mow of the barn, this silo was filled by means of a two-horse lever-power without a carrier. It was made of undressed boards three inches wide. They were simply set up edge to edge without either matching or beveling. But the experiment was a success. The dampness and heat of the silage closed the joints so that they became air-tight; and as I had but one door, there was only a small quantity of spoiled feed around it, and the necessary loss on top. The rest of it was as good silage as I now have in a patent silo made with staves that are tongued and grooved and beveled edges. Even a silo of that size will hold enough feed for three cows four months. My present one is 8 feet in diameter and 18 feet high, and for the last two winters has fed five cows four months. If I were in a regular dairy business I should provide silage for all my milking-cows for six months in the year.

I have spoken of the amount of feed one can get from corn. In the silo it is practically all utilized. Corn fed under the most favorable circumstances in any other way results in large loss. I have fed shredded fodder for a number of years and it is a rare thing to avoid a large loss of the feeding value of the stalks and fodder by this method because of both weathering and wastage of the harder parts, for it is almost impossible to get the whole crop properly shredded at the time of year when it has to be done. But corn put into the silo is all eaten. If the silage is properly made and properly fed, there need not be a half bushel of wastage from the whole bin. The corn is cut into half-inch lengths

while it is yet succulent, and even the hardest parts of the stalk so shredded and so softened by the heat and juices of the other parts all become palatable and cows lick up the last vestige of every feed.

But the utilization of the crop and the convenience for feeding are only two points in favor of the system. The dairyman cannot afford to be without silage on account of the saving of grain feed which it enables him to make. Good silage of corn and peavines is the nearest approach one can make for his cows to the conditions of June pasture. The succulence of the feed keeps the cows in good condition, the palatability of it gives them a good appetite, and the richness of it does away with the necessity of buying so much concentrated feed-stuffs.

My experience in feeding silage for a number of years has proved to me that one can keep his cows in better flow of milk on a ration of silage, with from 4 to 6 pounds of grain per day, than he can with dry feed, or dry feed cut and mixed with from 8 to 10 pounds of grain. This past spring, when my silage gave out before grass had come, I doubled the amount of bran and cotton-seed meal I had been feeding with silage and still my cows failed perceptibly in the amount of milk and butter they gave. I was feeding five cows. An increase of four pounds of grain feed per cow meant an increase of five cents in the cost of the ration per day for each cow; or twenty-five cents a day for the five. My silage had saved me twenty-five cents a day for four months; that is, it had saved me \$30 in my bill for grain feed for one winter for five cows. In the same way, one feeding ten cows and having silage for them six months in the year, would effect a saving in his grain feed of \$90. At this rate even the best silo will soon pay for itself. Nor can this saving be offset by the cost of silage itself. Under no circumstances should it cost the farmer who raises his own corn and peavines more than \$2 per ton. Can any one, then, afford to get along without a silo?

THE SILO.

BY A. L. FRENCH, ROCKINGHAM COUNTY, N. C.

In talking to you of the silo I feel that I am bringing to your attention a matter that is of the most vital importance to the stock farmers of the entire State, and especially to you of the western section. You have in all these mountain counties a vast acreage of land that can, to my way of thinking, be handled profitably only for grazing purposes, it being too rough to be farmed by machinery, and with our present high-priced help hand-working of our general farm crops is entirely out of the question. But a considerable amount of the stock you can summer-feed must be maintained through the winter also; and right here is where the silo comes to your aid.

You have a small acreage of excellent valley land capable of producing by the best methods of cultivation a large amount per acre of corn, cowpeas, and sorghum. We know from years of experience that in *no* way can as much good, nutritious feed be produced per acre as by the use of the silo. As by this means the *entire* feed plant is preserved in a *palatable*, succulent form, there being practically no waste at all, every pound being made available as the very best stock feed.

This is the first and greatest advantage of this method of preserving feed plants.

Another, and of almost equal importance, is that succulence is provided for winter, making practically grass conditions the year around.

The third advantage is that silage feed can be preserved at less cost per acre than by any other method. (This is not guesswork with us; we have the figures for it).

The fourth is that storage can be provided by the use of the silo for more tons of feed at less cost than by any other method of housing.

Another is, that no rough feed is as well fitted to be mixed with the more concentrated grains, as silage. This product always remaining damp and warm, meal adheres to it better than to any other rough feed, and consequently there is no waste of meal; and the two making a more bulky ration, the meal is more fully digested than if fed alone.

Now doesn't this make it plain to you that economy of production demands that where you have only a limited acreage of tillable land for the production of your winter feeds, you should utilize the silo in the preservation of this feed?

We have used several styles of silos and have come to the conclusion that where timber is not too high-priced the stave silo made of 2x6 or 2x8 inch pieces, the length you wish your silo to be in height, and banded with round iron rods, is the most economical to construct. The whole idea of silo construction is this: to have a round tub, the sides and bottom of which are air-tight and which is the same diameter from top to bottom. To construct these tub silos we use, as I have said, 2x6-inch staves. I like them to be tongued and grooved, like 2-inch flooring. For a silo 16 feet in diameter and 24 feet high we need about 128 pieces of 2x6 and two pieces of 4x6 the same length. When ready to erect the tub, we take our two pieces of 4x6, start about 6 inches from the bottom of them and bore two holes, one about 3 inches above the other and 2 inches from one edge, boring through the timber the narrow way. Then 16 inches above these holes we bore two more; then 24 inches above these, two more; and so on, widening the distance apart as we proceed, until at the upper end of the pieces the holes may be 4 or 5 feet apart. These pieces of timber are to take the place of *lugs* in holding our hoops together. Now, having our circular foundation built and extending above the ground 6 or 8 inches, we proceed to erect our tub by first erecting our 4x6 timbers, one on either side of our foundation and exactly opposite each other, and set edgewise to the circumference of the foundation, with the edge of the timber through which the holes have been bored to the outside. Stay these two pieces well, having them exactly perpendicular. The round iron rods we use for hoops will need a 4-inch thread run on each end of them, and each

hoop must be in two pieces, making each half about 9 inches longer than one-half the *outside* circumference of the tub. This extra 9 inches in length is necessary, because the ends of these rods are to pass through the holes bored through the 4x6 pieces, and as an end comes from each direction they will pass one another in the timber and must extend through far enough to receive a half-inch cast-iron washer and a nut. When the 4x6 pieces are up and stayed, put in the lower and upper hoops—working from ladder—then set in two or three staves around on the circle to hold the upper hoop up. Staple the hoops to these staves, then fill in the balance of the circle with the balance of the staves, driving them up tight and nailing with 10-penny nails. Your silo is then complete, except for sawing out the doors.

In emptying a silo it is necessary to feed off on a level all the way down, beginning at the top; and you will need about four doors at intervals up one side. Before sawing out the doors take some pieces of 2x4-inch stuff, cut in the length you want your doors in width, hollow one side of these pieces out so that they will conform to the curve of the silo, then nail two of them on at each point where you want a door. Now saw out the doors (about 18x24 inches in size), and saw on a slant on each of the four sides of each door, so that when done they will be about four inches longer and wider on the inside than on the outside, so that the pressure of the silage from the inside will hold them in place and will not push them out. When filling, before putting in the doors tack a strip of building paper around each edge. This will exclude all air that might otherwise penetrate between the rough edges of the doors.

We use no roof on our silos in the South. Have tested the matter thoroughly and find there is less depth of mould on top of a tub of silage exposed directly to the weather than in one covered. Another advantage with the open-top silo is that when the tub is filled nearly to the top of the staves we can nail up short pieces of board 4 or 5 feet long inside the staves, letting the pieces extend above the top of the staves 3 or 4 feet. Then stretch a piece of poultry netting or a strip of canvas around the inside of these pieces, raising in this way the height of the silo that much. Then fill right up to the top of this temporary structure, and when the silage settles it will be about even with the top of the staves, increasing the capacity by several tons. A feed-cutter with wind or chain carrier elevator is necessary to cut and elevate the product to the top of the silo, and I always advocate the purchase of a machine of not less than 18-inch throat. With one of these machines 8 to 10 tons of corn may be cut per hour.

Always, when possible, grow your silage near the silo, as a long haul adds greatly to the cost of harvesting the crop. *Never* dig down into the ground a foot when building a silo. Silage is heavy feed and should never be pitched up hill out of a silo. Let the shucks of your corn get brown before harvesting for silage and you will have a sweet, nutritious food, while if you cut it green it will be a sour, unpalatable mass.

A silo 16 feet in diameter and 24 feet high will provide silage enough for twenty head of grown cattle for six months; and this amount of feed can be grown on ten acres of well-prepared land in North Carolina at a cost of \$126, including every expense of growing and harvesting, also interest on land at \$25 per acre and interest on cost of the silo. Good serviceable silos may be built at less than \$1 per ton capacity. Clay is as good a bottom as a silo can have.

COMMERCIAL APPLE CULTURE.

BY F. C. REIMER, ASST. PROFESSOR OF HORTICULTURE, N. C. COLLEGE OF AGRICULTURE.

These remarks apply especially to the mountain section and the upper Piedmont.

Western North Carolina is especially adapted to apple-growing. The fruit has been tested by some of the leading horticulturists of the country and has been pronounced as fine in flavor and quality as that grown in any part of the country. This is due to several things. In the first place, plenty of sunlight during the growing season and a cool climate during a large portion of the year in which the apple flourishes. The apple is a cold-climate plant and the mountain section is very similar in climate to that of our Northern States, where apple-growing is carried on quite extensively.

Apples consume a very large amount of potash, and soil that is rich in potash will usually produce good apples. The red-clay soils of western North Carolina are known to be especially rich in potash, many of them analyzing as high as 2 per cent, and some of them as high as 4 and 5 per cent of potash. Potash is very essential in the making of the fiber of the fruit and is absolutely necessary in the formation of the acids which are so essential in good flavored fruit.

Culture.—The most important thing in apple culture is a proper location. It is very necessary that good transportation facilities are at hand. The apple is a perishable product and must be marketed at a certain time, and the marketing period usually covers only a very short time. It is best in locating a large orchard to be not more than five miles from the railroad. It takes a long time to haul apples over a rough road, and it injures them very much at the same time. The apple is a very tender product and must be very carefully handled.

Another important thing is the elevation. Many of the apple orchards that I visited during the past summer were located in the valleys, and very little fruit was found in these orchards. In most of the orchards which were located on the mountainsides some distance above the valley, an average crop was usually found. This is due to the fact that the fruit in the valleys is usually injured more by late spring frosts than that on the mountainside. There are two reasons for this: In the spring the trees blossom in the valleys much earlier than higher up on the mountainside; sometimes there is a difference of as much as two weeks. This means that the trees on the mountainside usually escape many of the spring frosts which injure the trees down in the valley. The tree is most subject to injury from frosts while it is in blossom; before the blossom opens there is very little danger. Another reason is that on cold nights the cold air, being heavier than the warm air, settles into the valley, while the warm air rises above this cold air. As most of us know, it is usually considerably warmer on the mountainside on a cool night than down in the valley.

If I were locating a large commercial orchard myself, I would certainly place it some distance above the valley. Just how much, will depend upon circumstances. Sometimes an elevation of from 50 to 100 feet will have a very material, beneficial effect; 200 to 500 feet is still better, and some of the orchards which are giving the best results are located as much as 800 or 1,000 feet above the valley. Of course, this depends somewhat on the variety or varieties grown, and I shall speak of that matter later. It is also a well-known fact that fruit on the south side of the mountain is usually better colored, because it gets more sunlight than that on the north side. On the other hand, fruit on the north side is not as liable to be injured by late spring frosts as that on the south side.

The soil should be very thoroughly prepared for an apple orchard. There are many people who believe that an apple tree will grow under almost any conditions, because trees in the forest grow without any attention whatever. These people, however, do not take into consideration the fact that the conditions in the apple orchard and the forest are entirely different. An apple tree, to give the best results, requires just as good attention as the corn plant. Before planting the apple the soil should be deeply plowed and then subsoiled. If the soil is poor

and worn out, it is necessary to get humus and plant food into it. This can be done by putting on stable manure and the growing of cover crops, such as cowpeas, clover, and rye.

Planting.—The best time for planting in the mountains is in early spring—some time during the month of March, depending somewhat upon the weather. East of the mountains it is better to plant some time during the fall—in October or November.

The distance apart to place the trees is a very important matter. Trees are usually planted too close. From 30 to 35 feet is a good distance for most of the larger-growing varieties, 35 feet being better than 30.

The hole should be made considerably larger than is necessary to receive the roots of the tree. This is especially necessary if the soil is very hard. The upper 6 or 8 inches should be thrown to one side and the lower or poorer soil into another pile on the other side; then in filling in this dirt, the upper richer soil should be put in first so that it will be immediately around the roots. Before putting in the plants the root system should be well pruned; all broken or bruised roots should be cut off, and all long roots should be trimmed back. It is not necessary to have the roots more than 8 inches long. These should be well spread out in the hole and the dirt tamped firmly about them. After planting it is necessary to prune the top so as to have it balanced with the root system and to form a proper head. In many of the old orchards the larger branches usually start about 5 or 6 feet from the ground. This is a bad method of training. The tops should be kept as near the ground as possible. It has every advantage: it is much easier to pick the fruit, much easier to spray the trees, and there is less injury to the trees from wind and storms. To form this proper head, cut the entire top of the tree off about 30 inches above the ground, and it is best to buy trees not more than two years old to do this to greatest advantage. Then the branches will start from the trunk below this point and the base of the branch will always be within 30 inches of the ground. Many people buy trees which are too old and consequently have formed a head in the nursery row, which is usually too high from the ground and badly shaped.

The first summer after setting, rub off all sprouts which start and are not desirable, leaving about four or five branches to form a head. It is well to have these starting at different points on the trunk so as not to form a sharp crotch in the tree, because there is great danger of the branches splitting off.

Varieties.—This question as to what varieties to plant is one of the most difficult connected with apple culture. It is impossible to name a variety that will do best under all conditions. The variety should be adapted to the section in which it is planted, and one that the grower has faith in. The grower should have an ideal as to time and kind of marketing. Then choose the varieties which come nearest to the ideal. Some varieties—like "Bonum," "Winesap," "York Imperial"—do well at a low altitude, while others—like the "Northern Spy," "Jonathan," and "Newtown Pippin"—do better at a high elevation.

Never plant seedling trees.

The following list includes the standard general market varieties which have been tested and have given good results in most sections of Western North Carolina:

Fall apples: "Bonum," "Hoover," and "Rome Beauty." Winter apples: "York Imperial," "Winesap," "Stayman," "Gano," "Limber Twig," "Virginia Beauty," and "Ben Davis."

The Newtown (Albemarle) Pippin usually does not do well except at a high elevation, in rich, cool coves with a northern exposure. For general market, plant few varieties. For local market, plant a goodly number, so as to cover the entire ripening season. Buy trees from reliable nurserymen; beware of tree peddlers.

Cultivation.—The apple tree should be cultivated as thoroughly as any other crop. This is especially necessary while it is young. If the hillside is so steep that it is impossible to do this with a horse, it should be done around the tree with mattock or hoe. Many people believe in cropping the orchard; and this is not a bad practice while the orchard is young, if the proper crops are planted. Always put in a cultivated crop; corn is a good one. Never put in such a crop as wheat or grass, which does not receive any cultivation. In planting corn in the orchard

the corn should be kept some distance from the young trees. The first year it should not be nearer than four feet and this distance to be increased from year to year until eventually when the tree comes into bearing the entire space should be given to the apple trees. The best method of cultivation is as follows: Plow the ground in the spring or disc it thoroughly, then go over it at least once every two weeks with a spring-tooth harrow until the middle of June. At this time the tree has stopped or should stop growing so as to prepare for winter. At the last harrowing sow in some cover crop. This will help to mature the trees; it will protect the ground during the winter, keep it from washing and prevent injury to the roots of the trees while increasing the plant food and humus content of the soil. This is a splendid method of feeding the apple orchard. In spring this cover crop should be turned under and the cultivation of the previous season repeated. If the soil is rich in plant food and humus it may be more economical to use this cover crop for feed and later return the manure made from this cover crop to the orchard.

What is the Best Cover Crop?—This depends upon the soil. Cowpeas, crimson clover, red clover, soy-beans, vetch, rye, and oats are all good. The red clover will not grow on all soils, and another objection is that it is a biennial and will not make very much growth during the first year. Where it is intended to leave it in sod for two or three years there is nothing better than red clover; but this would not allow of the method of culture suggested above. If cowpeas are used, it is well to sow in some rye during the latter part of the season, so that the ground will be covered with some growing crop during the winter months.

There are many orchards in which it is impossible to practice the above method of cultivation, since they are so steep that the soil would wash badly after plowing. In such case it is best to practice what is known as the sod-mulch method. This is to seed the orchard down, cut the grass whenever it is of sufficient height and pack it around the trees. While the trees are young, of course it should be immediately around the trunks, but as the trees grow older the distance from the trunk must be increased. The roots are constantly spreading out, and when the orchard is fully grown it is well to leave the grass where it falls in cutting. Probably the best crops for this purpose are a mixture of red clover and orchard grass. If any straw or weeds or poor meadow-hay can be had it is well to put this into the orchard also. This method keeps the soil from washing on steep hillsides, holds the moisture in the ground, and also protects the ground. It has given splendid results in some orchards, but in the mountains of this State it has not given as good results as cultivation combined with cover crops.

Apples require a large amount of potash, hence manures and fertilizers should be rich in this compound. Stable manure by itself is sometimes sufficient, especially on the red-clay soils which already contain much potash; but usually the manure is rich in nitrogen and poor in phosphoric acid. Then the orchard should receive a dressing of four or five hundred pounds of either bone-meal or acid phosphate every year. The nitrogen can be supplied by the growing of leguminous cover crops.

Pruning.—Pruning should start the year the tree is planted, and should be continued every year thereafter during the entire life of the tree. The tree should be open so that plenty of sunlight will get in so as to mature and color the fruit, and if the head of the tree is too thick, the fruit will also be small. All dead branches should be removed immediately. Wherever two branches seriously interfere with each other, one of them should be removed. Large branches should be cut off close to the main trunk or branch from which they originate.

Spraying is absolutely necessary in successful fruit-growing. This is a large subject, and I shall not attempt to cover it in this address. Any one wishing information on fungus diseases such as rots, blight, etc., can receive same free of charge by writing to Dr. F. L. Stevens, West Raleigh, and any one desiring information on insects can receive same from Prof. Franklin Sherman, Raleigh, N. C.

One of the greatest lessons that fruit-growers in the mountains of this State have to learn is how to properly harvest and market apples. Growing the crop successfully is only half of the operation. It is just as essential to market it successfully as to grow it. Apples should be *carefully picked, graded, and packed*. This whole subject is very thoroughly covered in a bulletin issued by the Department of Agriculture, Raleigh, N. C., and any one desiring same can have it free of charge by writing to the Department.

LECTURES DELIVERED AT WOMEN'S INSTITUTES.

The following three lectures were delivered at the Women's Institutes during 1906. Of necessity they are shorter and more formal than when spoken, and thereby lose some of their original force:

LITERATURE IN THE FARM HOME.

By MISS VIOLA BODDIE.

The deeper one penetrates the hidden mysteries of life, the more is he filled with admiration for the beautiful simplicity, the perfect harmony, of creation. God's law is ever the same, whether in the physical, mental, or moral world. Obedience to that law means health, growth, happiness, life. Disobedience means disease, sorrow, pain, death, decay. That law says all growth is dependent upon food and exercise. No sooner does the human body fail to be supplied with the proper food than weakness and disease follow, ending in death. Cease to exercise any muscle of your body and it becomes weak, finally losing its power. We know that we must select not only nutritious food for our bodies, but we must guard against poisonous substances that may produce slow disease, if not sudden death.

This law is equally true of our mental well-being. A well-known breakfast food has upon its wrapper, "Tell me what you eat, and I will tell you what you are." The student of character-building would say, "Tell me what you *read*, and I will tell you what you are." Literature is the great mental granary or storehouse from which we draw the precious fruits of the master spirits of all ages. To sit at their feet, in the body, may have been denied us; but their written thoughts may be ours for the asking. With these we may be on most intimate terms, whatever gulf of time or caste may have separated us from those who wrote these precious truths. Here we may be taught to avoid the mistakes that have been made in the past; here we may walk in the paths trod by the successful men and women of the world; here we may think the thoughts and dream the dreams of the Godlike spirits who have seen visions of the things yet to be—visions of hope that lift our feet far above the dust and mire of the steep road that many of us must travel in this work-a-day world! In books we may always find sympathetic friends—friends that never fail us, that never grow jealous, never chide, never misunderstand, are never too busy to entertain us.

Shall the country woman, who is often so far from friends in the flesh, be denied these wholesome companions in spirit? Shall she who so often needs to be cheered and uplifted after the daily round of petty cares and endless drudgery be denied this spirit communion—these visions of the larger life? Shall the farmer who cannot attend the club, and who seldom has time or opportunity to sharpen his own ideas on the grindstone of social converse, be deprived of these wise counselors, these able helpers? Shall the country child to whom other playmates are often denied by circumstance, not hold daily converse with the dear children of literature, such as "Little Lord Fauntleroy" and "Emmy Lou"? No; town people may do without these companions better than the farmer's family. People of the town have for their instruction other means than books. They have more opportunity for companionship and recreation.

The farmer's family can make no graver mistake than to think that there is no time for reading in the farm home, that the economy often necessary in the farmer's household does not allow the luxury of books, magazines, and papers. If the country housewife is wise, she will recognize that these are necessary for the well-being of her family, and not luxuries that may be dispensed with. She will realize that good reading matter is as essential for the mental and spiritual well-being of her children as is good, wholesome food for the growth and strength of their bodies. The farmer will economize to poor advantage if he saves by

refusing to subscribe to some good agricultural journal, to take at least a few of the best magazines. One of these should be the best obtainable on household economics. I say *best*, for they are always cheapest, though their subscription price run up into the several dollars per annum. As you cannot afford to give your children other than the most wholesome food, you cannot afford to feed their minds on aught but the purest literature.

Be wary of the book agent, for often you will pay him the price of a small library for a worthless book. Beware of the cheap novel, the so-called "light reading" for the long summer afternoon. Do not allow maudlin, sentimental stories to find their way into your home. Often these by their unreal situations and morbid atmosphere are more harmful to youthful minds than open delineation of crime. Some books, although they contain nothing that is actually harmful, are a sad waste of time. Such books can form only waste matter to clog the brain.

The Rural Free Delivery, as great a blessing as it is, is not without its attendant evil. Countless numbers of patent medicine sheets and advertisements of various swindles are being dumped into the rural letter-boxes. The reading matter in these are as pernicious to men's minds and characters as is the medicine they advertise to their bodies. I beg you, kindle the fire with these as soon as they arrive.

Rightly has the Good Book said: "Of making books there is no end; for countless are their numbers." We who would admit only the good into the sanctuary of our homes must choose wisely. There are many books that have stood the test of time, that have proven their truth by their immortality. Choose these rather than "the latest book," which may be dead by the time the printer's ink is dry upon it. Biography furnishes a most wholesome stimulus to character development. The boy who is familiar with the lives of Washington, Lincoln, and Lee can but be a better American citizen because of this knowledge. Nature stories and stories of animal life will serve to open the eyes of the country child to the things about him. I know of no better way of correcting the seemingly inherent cruelty of the growing lad than to teach him the place each animal occupies in the economy of nature. The child's mental horizon should be widened by books of travel and adventure. For the development of the finer sensibilities and to get that glorious vision of truth clad in the rainbow hues of language one must read the poets. Wholesome fiction has its place in any well-balanced course of reading, but we must never forget that it is the "sugar" of one's mental diet, and that taken in too large quantities it destroys the mental appetite for the tissue-building forms of literature, even if it does not disorder one's mental digestion. Unnatural or morbid fiction read at a certain stage of character development can but prove disastrous.

As no dietician could prescribe diet for the several families of your community without knowing the age and peculiar physical needs of the members comprising each household, just so I would not presume to offer you a list of books that would be the best mental food for every household in your community. I have with me, however, a list of books that will bring into your homes many time-honored sages, many charming companions for both old and young. I beg that you do not refuse them admission, for many of this princely train may be entertained at a very small cost! Their presence in your home will help to exclude idle gossip, banish dull care, and enthroned hope and good cheer. When once your children have learned to hold sweet converse with these at home, they will no longer frequent the questionable places of amusement in which our young people are too often found.

HOME-MAKING AND HOME CONVENIENCES.

BY MISS H. MAE CARD.

The word "home" thrills us with delight. A happy home is a blessed remembrance and a safeguard to the young when they leave it and go out into the world. It is important because in the home are reared the boys and girls who are to become the men and women of to-morrow and into whose hands will fall the welfare of our Nation and the progress of Christian work.

In these days we hear much about "woman's rights." Rights she certainly has; but to go to the polls and cast her vote is not the greatest one. The opportunity of moulding the character of the young life entrusted to her care is the greatest privilege she can ask, the greatest right she can claim.

In order to do this important task, wisely and well, the mother must not spend all of her time in the kitchen and at her housework. Solomon says the wise woman "looketh well to the ways of her household." The inmates are of more importance than the house. For this reason she must simplify her living and plan her work to make it as easy as possible to have the time to devote to the culture of the head and the heart.

Here are a few suggestions which may help some one to simplify the work which falls to the lot of the average farmer's wife: First let us look into the kitchen. I mention the kitchen first, for to the woman who does her own cooking it is the most important room in the house. More than that, it is one of the most important workshops in the world—important because it is there that the materials are prepared which are to build the strong and healthy men and women of our country. Can you think of a workshop more important than that? And yet, as a rule it is the most poorly equipped in the world. Go into a man's workshop and notice how convenient it is. Every necessary tool is there and in the most convenient place.

The kitchen should be well lighted and easily ventilated. It should not be so large that the housewife has to travel several miles while preparing her dinner. A kitchen large enough to eat in and for the men to sit around in, on rainy days, is not an ideal kitchen to work in.

Place the stove, which should be the very best you can afford—if possible, a range with all its modern improvements—between two windows. Lower the windows from the top and much of the heat and steam will escape. Have a shelf near the stove on which to place the utensils used constantly around the stove.

If the kitchen table be covered with aluminum or zinc, hot pots may be placed upon it, and no scrubbing is needed to keep the table top clean. If rollers be placed on the legs, the table may be easily moved to the stove, when frying batter-cakes or cooking anything which needs constant attention, and many steps be saved. An improvement on the table is the kitchen cabinet with its drawers, bake-board, and receptacles for sugar, spices, and flour.

A high stool on which to sit at the table or sink when preparing the vegetables will rest the tired feet. The rough ironing may also be done while sitting on this stool. Form the habit of sitting as much as possible while at your work. Have an easy chair or a little rocker in which you may rest while waiting those five minutes for that pie to finish baking. Save your strength and energy.

Do not get the mistaken idea that all your cooking utensils should be away in the pantry out of sight. If clean and bright they are an ornament to your kitchen. Screw some brass hooks into two strips of moulding and tack them up over the kitchen table. Here hang the egg-beater, masher, strainer, and utensils used daily in the kitchen. Have a hook for each article, those used oftenest in the most convenient place, and always keep each article on its proper hook. Above this, place a shelf for the cans of tea, coffee, etc. These may be enclosed, if you prefer, in a small cupboard.

Fifty years ago, the whiteness of a woman's floor was the guage by which her housekeeping was judged. But that is no longer so. For those who have not the hardwood floors and cannot afford oil-cloth, there is the pot of paint. What renovating powers a pot of paint possesses! Think of the labor it saves.

One other thing that every kitchen should possess is a sink. This does not necessarily mean that you have the water-works in the house. Even if you have to carry the water in, it is not necessary that you carry it out. A sink can be put in at a very low cost. A home-made one serves the purpose very well. Bore a hole in the bottom of a wooden sink; line the sink with a piece of galvanized tin; tack a piece of perforated tin under the hole and fasten a large funnel under this; to the funnel fasten a piece of garden hose, which is put through a hole bored in the kitchen wall. The waste water may now run out-of-doors into a barrel on wheels. If a sieve is fastened to the corner of the sink and the water poured through it, the parings, etc., will be caught in it and the trouble of gathering them out of the sink will be saved. Do not have the space under the sink enclosed, as it is apt to become damp and forms an excellent hiding-place for cock-roaches, etc.

There are many people in the country who at a very small expense could have water in their houses. On some farms there are flowing springs where a hydraulic ram and a few yards of piping would carry the water into the house. We are apt to envy our city sisters, when often what they pay yearly for these conveniences would put the same into our country homes. If you have not access to a spring, and think you cannot afford a windmill, you can by means of a force-pump, pump the water into a large vat or reservoir placed in the garret and thus supply the bath-room and kitchen. This reservoir may be filled every day, or it may be large enough to hold water to last a week. If a bath-tub is needed anywhere, it is on the farm.

There is nothing better than a refreshing bath, a clean waist, and a pretty neck-ribbon to put a woman in the proper spirit to meet her family at the tea-table.

Let me make a plea for the dining-table. First, do not let it be laid, especially in the summer, in the kitchen, with its steam and heat and swarms of flies. I have seen such uninviting tables, where the cloth was not the whitest, and the dishes had apparently been thrown on the table in the quickest manner, and I did not wonder that the husband and sons swallowed their meal as quickly as possible and sought the more pleasant atmosphere of the porch or barn. Do not consider that time spent in making your dining-table neat and inviting is time wasted. A spotless cloth, shining dishes carefully arranged, a few flowers or a plant, will not be without their reward.

Mothers, do you realize that it is only at the dining-table that you have your whole family together? Make the most of your opportunity. Use this time to create and maintain that spirit of good fellowship and love which bind the family together and make a happy home. Here is the place for the nonsensical anecdote, the funny story, the pleasant jesting. The light froth of pleasantry that brings the smile to the face and cheers the heart is one of the best things to smooth and brighten the family life.

It may cost you an effort to wear a smile when the heart aches, to be cheerful when you are overtired and things in general have gone wrong, but it is worth the effort.

The home is the center of the universe—woman is the center of the home. Civilization is therefore dependent upon her health and her stimulating influence. All household improvements designed to conserve her strength will add to her power and efficiency.

FARM DAIRYING.

By J. C. KENDALL.

I have been assigned to talk to the women because they are the ones who have charge of over three-fourths of the dairy work done in the State. Most of the butter made in North Carolina is produced on a small scale. The strictly dairy farms (farms deriving 40 per cent or more of their income from dairy products) make up only about 4 per cent of the total number of farms. Another fact worthy of note is that only a little over 10 per cent of the butter made in the State is sold, which shows that butter is made largely for home consumption.

These figures show that we have to do with farm dairying; and its problems are just as great, if not greater, in proportion to the work done, than the problems to be found in the older dairy districts.

It is a very common practice to allow calves to run with the cows. Some milk the first milk—the poorest—and allow the calf to take the rest. Have you ever seen one of these cows “hold up her milk” and give it down only when the calf was allowed to suck; and have you ever seen the milker shove the calf away quickly and then try to get as much milk as possible, and then let the calf have a chance, continuing the change with the calf until the milking is finished? I have; and such a cow is only worth half of her value as a dairy cow.

The calf should be taken from the cow the second day, and taught to drink. Never let it go back to the cow. The value of the calf does not warrant the use of the whole milk. Butter fat is too valuable to feed to scrub calves. The calf should be fed whole milk for ten days or two weeks and then gradually have some skim-milk added, at the same time having some fat substituted in the form of grain to take the place of the butter fat. Flax-seed meal makes a good calf-feed. As soon as the calf will eat it, hay or other roughage should be given.

Now how shall we handle the milk? If you want the milk to remain sweet a long time you must take great pains to see that everything that comes in contact with the milk is kept scrupulously clean, and if a damp cloth is used to wipe the udder just before milking it will be found very effective in reducing filth (so-called “cowy odor”) that so easily gains an entrance to the milk at this time. The milk must be cooled at once. Next in importance to preventing contamination of milk is controlling its souring by regulating its temperature. By quickly cooling milk after it is drawn its keeping qualities can be prolonged for several hours.

If butter is to be made, do not churn whole milk. I know this is often done, and many who are present will not agree with me when I say that churning milk not only means many hours of useless labor in churning, but good butter is seldom made, and there is too much butter left in the buttermilk. The shallow pan, with all of its faults, is much to be preferred for separating cream than churning milk. The only excuse for churning whole milk is when you prefer making buttermilk to butter. I said that you could not make as good butter, and I will tell you the reason. In order to churn whole milk it is necessary to churn at a high temperature, and when you use a high churning temperature you ruin the grain of the butter and there is too much casein (cheese material) incorporated with the fat. Such butter will not keep well. This butter when placed on the table in summer-time flattens out and quickly takes the shape of the plate. You all know the kind I mean—the butter you have to handle with a spoon.

Use some system of raising cream. The least desirable is to strain the milk into pans about 3 or 4 inches deep and allow it to stand for 36 hours. There are a number of reasons why this is not a good way to separate cream. It loses too much fat. The cream and skimmed milk is sour, and the pans are not usually set in a suitable place. A home-made device can be made that will be useful in this work. Put shelves in a large box or cupboard, and make a frame door over which tack cheese-cloth, and set in a cool place. This will permit the air to circulate, but prevent dust and flies from falling into the milk. If earthen crocks are used, and cool water is at hand, then the depth of the milk can be increased and better results obtained.

The best method of separating cream, next to using a separator, is to use deep cans about 22 inches high and 8 inches in diameter, and set those cans in cold water. A cement tank is, of course, best for this purpose; but a stout box lowered in the ground with a cover over it will answer the purpose. Bore some holes in the side of the box at a proper height for an overflow. If pieces are tacked on the inside of the box at the proper height, then a lath placed over the top of the can with the end under, these pieces will keep it in place even when it is only part full.

Have nothing to do with those so-called separators where water has to be added to the milk to cause the cream to separate. I have only a word to say about separators. If you possibly can, get one. If you have only seven cows, sell one and buy a separator. Six cows and a separator will produce as much as seven and the old method. If you only have three or four cows and want to do the best with them, buy a separator. Leaving out of the question entirely the convenience of using a separator, it will pay you eight or ten dollars in butter fat saved on every cow you keep.

What does churning consist of? If you look at a drop of milk under a microscope you will find great numbers of very small fat globules, millions in a single drop of milk. Now when we churn we simply cause these little fellows to unite by knocking them together; consequently, anything which causes these little particles to become hard will tend to cause trouble in churning. These are some of the things which cause fat globules to become hard: feeding large amounts of cotton-seed meal; majority of herd nearing the end of milking period; feeding dry food; and most important of all in effect upon the hardness of butter fat is temperature. Only a few degrees will make a good deal of difference in the time it takes to churn and the quality of the butter. A high temperature makes churning easy, but ruins the quality of butter, and is wasteful of butter fat. This will be found a guide to the best churning temperature: Churn at as low a temperature as you can and get the butter to come within thirty minutes. Sixty degrees in winter and 58 degrees in summer are the usual churning temperatures.

If you have trouble in churning, ripen the cream well and raise the churning temperature a few degrees.

A dairy thermometer is a necessity. You cannot afford to be without one. It can be bought for 25 cents; and avoiding churning two or three extra hours and producing a better grade of butter will soon pay for it. The practice of adding hot water and cold water every little while during churning does not tend to produce the best butter. Use a thermometer and see that the cream is at the right temperature when it is placed in the churn. Never put water or ice into the cream. Regulate the temperature by placing cream jars in water.

Have nothing to do with patent churns. They are humbugs. I know if the men have anything to say about it, and a smooth-talking agent comes along with one of his little wonders the next day after churning has occupied the larger part of the day, and takes some milk or cream and churns it in about five minutes, they will buy one. But do not be deceived. You can also churn as quickly in the old churn if you do it in the same way, and make the same kind of grease. Use barrel or swing churns without floats.

Stop the churning when the butter is about half the size of a pea. Draw off the buttermilk and rinse only enough to remove the buttermilk. Be sure to regulate the temperature of the wash-water. Do not allow butter to stand in water, as it takes out the fine flavors.

Butter should be put up in a neat, attractive package and bear some distinctive mark. Study your market, and if local dealers will not give you good prices, there are plenty of places in the State that will. There is always a ready sale for good butter, and print-butter can be shipped hundreds of miles in a shipping case and not be injured.

If you would keep butter, it is best to put it down in an earthen crock, rub salt on the inside of the vessel, press the butter firmly to exclude air, and make a heavy brine to protect the top. Such butter, if put in a cool place, will keep in a good condition for several months.

THE BULLETIN

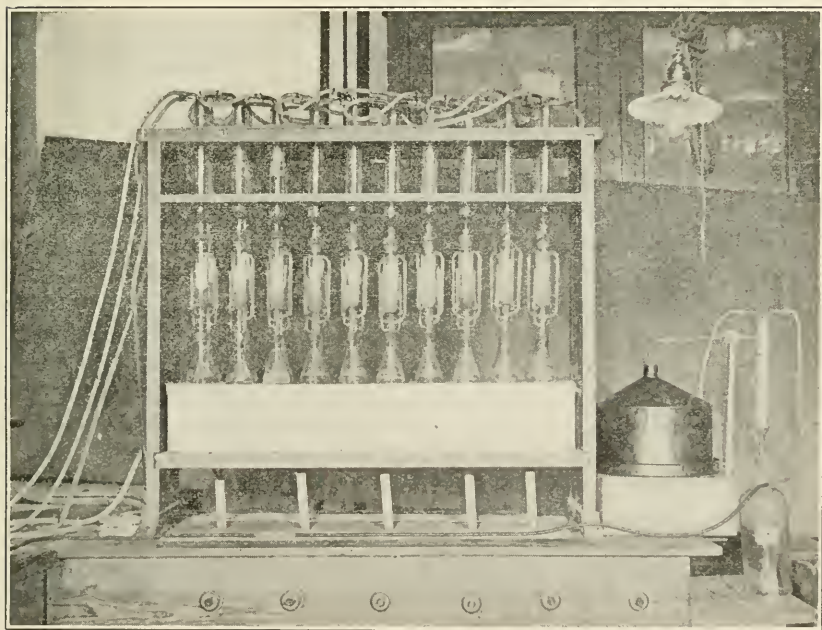
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INSPECTION AND ANALYSES OF CONCENTRATED
STOCK FEEDS



APPARATUS FOR DETERMINING THE FAT IN FEEDS

NOVEMBER, 1906

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 11.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, NOVEMBER, 1906.

FOURTH REPORT ON CONCENTRATED FEEDING STUFFS AND COTTON-SEED MEAL.

BY

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ANALYSIS OF FEEDS,

AND

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Since the publication of the last Bulletin on Concentrated Feeding Stuffs, 392 samples have been collected and examined. The number of samples of each brand collected is as follows:

Wheat Bran	56
Wheat Middlings	51
Bran and Shorts	22
Shipstuff	42
Corn and Oat Feeds	5
Rice Feeds	2
Molasses Feeds	7
Hominy Feeds and Chops	21
Cotton-seed Feeds	4
Miscellaneous Feeds	56
Cotton-seed Meals	75
Miscellaneous Feeds, Examined Microscopically	51
Total	392

Introduction.

Under the present feeding-stuff law every bag of feed offered for sale in the State must have a guaranteed analysis on every bag or tag attached to every bag.

The name of those feeds appearing in this Bulletin without a guaranteed analysis are samples sent in by manufacturers, merchants, and farmers for the purpose of getting the opinion of the Department as to their true quality and value, based upon a chemical and microscopical examination.

One of the most noticeable violations of the law during the past year has been the misbranding of bran and shorts.

Of the twenty-two (22) samples of feed marked or branded bran and shorts, eleven (11) were pure bran and shorts, while eleven contained other materials than are indicated by the names.

These latter eleven samples are reported under the heading of adulterated bran and shorts.

There were no labels or markings of any description to indicate to the intending purchaser that these feeds were not pure bran and shorts as labeled. Two samples of wheat feeds were found adulterated with corn-cobs.

Of the fifty-six (56) samples of wheat brans examined, ten (10) were not wheat brans as represented, but were mixtures of wheat bran and low-grade materials.

These are reported under the head of adulterated brans. With the few exceptions mentioned above, feeds are practically free from adulteration and are up to average quality.

A Synopsis of the Present Feeding-stuff Law.

The law requires:

(1) That every bag of feed, whether pure products or mixed feeds, must bear a guaranteed analysis along with the name and address of the manufacturer.

(2) All feeds enumerated in section three of the law (except the whole grain, ground and pure-wheat products) must also have a tax tag attached.

(3) All feeds must be in standard-weight bags of 80, 100, 125, 154, 182, 200 pounds each.

(4) Section seven prohibits the adulteration or mixing of any feeding stuffs with ground rice chaff, ground corn-cobs, ground peanut shells, or ground oat hulls.

(5) All feeds must be kept up to their guaranteed analysis and the standards adopted by the Department of Agriculture.

(6) The law provides for the analysis of the various feeds found on sale in North Carolina, and the results of the analysis, together with such additional information as circumstances advise, shall be published in reports or bulletins from time to time.

In enforcing the law we have had four main objects in view:

(1) To stop the sale of adulterated feeds in North Carolina.

(2) To educate the consumers to buy feeds according to the analysis on the bags, just as he buys his fertilizers by an analysis.

(3) To teach the dairymen and farmers the best way to combine their home-grown feeds with those they are compelled to buy to get the greatest benefit from the amount consumed.

(4) To stimulate a desire on the part of consumers for better feeds.

Standards Adopted.

As the present law requires that every bag must have a guaranteed analysis attached, and gives the Department the right to adopt standards for the different feeds, the following standards have been adopted. For Pure Wheat Bran, Pure Wheat Shorts, and Pure Wheat Bran and Shorts mixed:

	<i>Protein.</i>	<i>Fat.</i>	<i>Crude Fiber.</i>
Wheat Bran	14.5	4.00	9.5
Middlings	15.00	4.00	6.00
Bran and Shorts	14.5	4.00	8.00

Standards for the other feeds will be adopted as soon as this Department has had time to accumulate enough information and analyses to justify it in adopting standards that will be fair to both manufacturers and consumers.

How Feeds are Inspected in North Carolina.

Feeds are inspected by sending inspectors over the State to see that the requirements of the law are complied with. The inspectors of feeds carry a complete microscopic outfit with them for the examination of feeds, and examine every sample of feed they take in the towns in which they find them. If any are adulterated, they are immediately withdrawn from sale. In the inspection of feeds in 1904 in this manner something over one hundred car-loads of low-grade and adulterated feeds were seized and withdrawn from sale in this State. There is no special season for inspecting feeds, as there is for fertilizers, but they are inspected from time to time during the year.

All samples of feed collected are sent to the State Chemist for a chemical analysis.

Samples Collected.

Raleigh	7	Monroe	1
Claremont	2	Hickory	14
Wilmington	7	Clyde	1
Mt. Airy	7	New Bern	1
High Point	9	Wilson	2
Mocksville	4	Walkertown	5
Statesville	8	Shelby	1
Burlington	3	Randolman	2
Charlotte	6	Aberdeen	1
Ashboro	10	Washington	1
Elon College	2	Durham	5
Kings Mountain	1	Greensboro	2
Concord	2	Winston	4
Thomasville	3	North Wilkesboro	3
Archdale	1	Salisbury	7
Fullers	1	Spencer	1
Goldsboro	3	Bessemer City	1
Milton	1	China Grove	2
Asheville	3	Reidsville	1
Canton	1		

Besides the above, a large number of samples have been sent in and analyzed for manufacturers outside of the State, as well as for farmers, dealers, and manufacturers within the State.

Effects of the Feed Law.

The sale of adulterated feeds in North Carolina has greatly decreased since the feed law was passed in 1903.

This fact is brought out by comparing the results contained in this bulletin with those in previous bulletins on Stock Feeds issued by this Department.

Feeds made up largely of peanut middlings, peanut bran, oat hulls and corn-cobs are no longer offered for sale.

The enforcement of the law has driven this class of goods from the State.

Branding of Feed-stuffs.

The cut below represents the proper branding and guaranteeing of feeding stuffs.

The guarantee may be printed on the bag or on a tag attached to the bag, or on both.



Properly Branded Bags.

All feeds must bear a guaranteed analysis and be kept up to that guarantee. The consumer should see that the feed is properly tagged before purchasing. He should also see that the feed contains the feeding constituents he is in need of for the purpose he is going to feed.

Duty of the Department of Agriculture.

It is the duty of the Department of Agriculture to see that all feeds are properly marked, to collect and examine them in order to note whether they are as represented, and to publish the results for the benefit of all interested parties.

The Department also analyzes free any sample of feeding stuff sent in.

The Department stands ready, through correspondence and through the personal services of its regular inspectors, to furnish whatever information it may possess concerning the character and nutritive value of all feed stuffs.

In executing the law the Department has endeavored to be of service to manufacturers, dealers, and consumers, and wishes the coöperation of all, in order that the efficiency of the work may be increased and its scope extended. The Department will not stand in the way of legitimate trade, but intends to enforce vigorously the law and to drive from the State low-grade and adulterated feeds.

How to Buy Feeds.

It needs to be constantly borne in mind that concentrated feeds are bought to supply a deficiency of protein in those raised on the farm.

With all classes of feeds high percentages of protein and fat indicate high feeding value. This is well illustrated in cotton-seed meal, linseed meal, soja beans and similar feeds. High percentages of fiber, on the other hand, go with materials having comparatively low feeding value. The farmer, in buying concentrated feeds, should have these facts clearly in mind. The analyses presented in this Bulletin show that where the materials have 5 to 10 or even 12 per cent of protein, there are, as a rule, also large quantities of fiber, which means that the by-product is the coarse, chaffy part of the grains, or else these materials have been ground with the other products. Of two feeds having an equal amount of protein, the one which has the smallest amount of fiber is the more valuable, and the farmer will not go far astray if he values the concentrated feed which he purchases in proportion to its content of protein and fat. Except at extremely low figures it is doubtful if it will pay any one to purchase concentrated feeds containing less than 8 to 10 per cent of protein, and when they go below these figures they should be looked upon with suspicion.

At present the prevailing prices of concentrated feeds bear very little relation to their feeding value.

The same price is frequently paid for feeds whether they contain 42, 28, 20, 15 or 8 per cent. protein.

Definitions and Descriptions of Products.

The name commercial feeding stuff, or concentrated commercial feeding stuff, is usually applied to a class of substances which, in a majority of cases, are the by-products of other branches of industry. Some of these articles, as brans, middlings and cotton-seed meal, have been the daily diet of domestic animals for many years. These products are mainly as follows:

From Wheat.

Bran.—This consists of the outer portion of the wheat grain, and, though somewhat rich in indigestible fiber, is a valuable feed because of its protein and fat content. It is also rich in phosphates and potash salts.

Shorts and Middlings.—In the feeding-stuff trade these two products are frequently the same and are the inner coatings of the wheat grain and are made up of smaller fragments, together with portions of the more starchy part of the wheat grain.

Wheat Germ consists of the embryo of the wheat grain. It is rich in oil and protein.

From Corn.

Maize or Corn Bran is the outer husk or coating of the corn grain. It is high in fiber and of low feeding value.

Gluten Meal is the more nitrogenous portion of the corn grain, which lies just below the husk. It is what is left after the bran, germ and starch are taken from the grain in the manufacture of starch.

Germ Meal or Cake is the nitrogenous and fatty residue left after extracting the oil from the germ of corn. It is very digestible and an excellent feed.

Corn-cobs consist largely of woody fiber and consequently have low feeding value. When corn has not fully ripened more nutriment remains in the cob, as it is not then so hard and woody. Cobs, when ground with the grain belonging to it, are not objectionable, but rather improve the feed for cattle and horses.

Corn and Cob Meal.—Frequently corn, together with the cob which bears it, are crushed together at the same operation, the resultant product being called corn and cob meal. It is a good feed when well ground.

From Rice.

Rice Meal or Bran is the outer layers of the rice grain, together with portions of the germ. They are rich in nitrogenous matter (protein) and fat, and are high in percentage of ash, or mineral matter.

Rice Polish is a fine powder and is a still more highly nitrogenous feed than the meal or bran, as a rule.

From Oats.

Oats are almost entirely employed whole or crushed as a feed stuff. The by-products from the manufacture of oat-meal are comparatively worthless; the husk or hull, which is the main part of this by-product, being mainly woody fiber, and therefore of but little feeding value.

From Barley.

Malt Sprouts.—Malt is produced by soaking barley in water and allowing it to germinate until the shoots attain a certain length. The malt is then kiln-dried and the shoots broken off. These dried shoots

are called malt sprouts and are rich in protein and mineral matter. They are good feed for pigs and cattle.

Dried Brewers' Grains consist of the residue left after "mashing" the malt, whereby the greater portion of the carbohydrates are converted into sugar and removed. They are largely employed locally as feed for dairy cows. The grains direct from the breweries contain too much water and are too liable to change to permit of their being used except in the immediate vicinity of breweries. When dried they are a valuable feed and are sold under the name of dried brewers' grains.

From Peanuts.

Peanut Cake or Meal is the residue from the extraction of oil from the peanut kernel. It is a very valuable concentrated feed, being rich in both protein and fat. This product, as well as other concentrated feeds, is not infrequently adulterated by grinding with it peanut shells.

From Cotton Seed.

Cotton-Seed Meal is the ground residue from the extraction of cotton-seed oil from the cotton-seed kernels. Cotton-seed meal of standard grade in this State must contain $7\frac{1}{2}$ per cent of ammonia, which is equal to 38.62 per cent protein. Higher grade meals contain forty and more per cent. When of good quality there is no better feed on our markets for beef cattle and milk cows. Cotton-seed meal is sometimes adulterated with cotton-seed hulls. Occasionally cotton-seed meal from Sea Island cotton seed comes on our market. It is never as valuable as the meal from our upland cotton seed, because it is impossible to separate the hulls from it. It usually has one-half to two-thirds the feeding value of good upland meal.

Composition of Feeds.

An analysis of a feed should give the percentages of protein, fat, crude fiber, ash, moisture, and nitrogen-free extract.

Per cent means the number of pounds in 100.

If a feed has 15 per cent protein, it contains 15 pounds of this nutrient in every 100 pounds of the feed, or in a ton (20x15) three hundred (300) pounds of protein.

By chemical analysis foods are separated into six classes of substances, viz.:

1. *Water*, which is present in all feeding stuffs. It composes about 80 per cent of green and succulent fodders, about 90 per cent of root crops, 75 per cent of silage and 10 to 15 per cent of hays and grains. In these it is present as mechanically adhering or hygroscopic moisture. It is a necessary constituent of the animal body, of which it makes up 40 to 65 per cent. Water is determined by heating the substance for several hours at the temperature of boiling water, at which temperature it passes off as steam.

2. *Ash* is the inorganic or mineral matter of plants, and is the residue left after burning till all volatile material is driven off. It is composed mainly of soda, potash, lime and magnesia, in the form of phosphates, sulphates, chlorides and carbonates. Ash furnishes the materials for the bony structure of animals, and enters to a much less extent into the tissues and organs.

3. *Fats* (*Ether Extract*) represents whatever is dissolved from foods by dry ether. It is composed mainly of fats and oils, but contains, in addition, quantities of gums, wax and coloring matter, depending upon the substances extracted.

4. *Protein*, the term as used in connection with fodder analyses, includes *Albuminoids* and *Amides*, the albuminoids being the more valuable and at the same time composing by far the larger portion of the protein compounds. They are the nitrogenous compounds of plants and animals and are determined by estimating the nitrogen in them, which element composes about 16 per cent of the weight of protein substances. None of the other classes of substances contain nitrogen. They are represented in the animal body by ligaments, lean meat, muscles, tendons and tissues.

5. *Crude Fiber* or *Cellulose* is the cell wall and structure material of plants, and is usually the most indigestible portion of them, but when digested is considered of equal value to starch and sugar. The lint of cotton is almost pure cellulose. Its composition is similar to that of starch. It is determined by boiling the food stuff with weak acid and alkali, thus dissolving all other constituents. *Crude fiber* and *nitrogen-free extract* taken together are known as carbohydrates.

6. *Nitrogen-free Extract* is the term applied to those non-nitrogenous constituents of foods which are represented in the main by sugars, starch, dextrin and gums. They all contain carbon, hydrogen and oxygen, but no nitrogen, as does protein. Nitrogen-free extract is estimated by difference, it being equal to the difference between the sum of the above five constituents—water, ash, protein, fats and crude fiber—and 100. It is, perhaps, the most inaccurate of all the determinations in a food analysis, inasmuch as all the errors and differences in the other determinations fall upon it.

Dry Matter and Organic Matter.—Neither of these terms represent a single class of constituents or nutrients. Dry matter is what is left of a plant or food stuff after the water is driven off or subtracted, and organic matter is dry matter minus the ash. For example: if the original food stuff as fed is represented as 100 per cent and it contains 10 per cent of water and 5 per cent of ash, then dry matter is equal to 100 per cent, less 10 per cent water, or 90 per cent, and organic matter is 90 per cent dry matter, less 5 per cent ash, or 85 per cent.

To enable those not familiar with the subject to gain a clear idea of the parts of food stuffs, and the terms representing them as used in fodder analyses, the following statement is presented:

Food-stuff. { Water.
 Dry Matter. { Ash.
 { Organic Matter. { Protein.
 { Fats.
 { Carbohydrates. { Nitrogen-free Ex't.
 { Crude Fiber.

Nutrients.—Protein, fats, carbohydrates, nitrogen-free extract and crude fiber and mineral matter are called nutrients because of their functions in animal nutrition. Nitrogen-free extract and crude fiber are included together under the one name of carbohydrates, because they are all compounds of carbon, hydrogen and oxygen, and the digestible portion of each is considered of equal value and perform the same offices in animal nutrition. Familiar examples of the four classes of nutrients are presented below. Water is omitted because it is the same whether taken in food or drink, and we do not feed a fodder for the sake of the water it contains.

Protein. . { Albumen (white of egg), washed lean meat, casein, or
 { curd of Milk, gluten of flour, fibrin of blood, gelatin,
 { curd, etc.

Fats. . . . { Cotton-seed oil, linseed oil, olive oil, corn oil, wheat oil,
 { oat oil; the fat of milk (butter), the fat of meat, hog
 { (lard), mutton (mutton suet), beef (tallow), fish oil,
 { etc.

Carbohy- { Sugars (cane sugar, milk sugar, and glucose), starch,
 drates. { dextrin, gums, woody fiber, etc.

Mineral { Sodium chloride (common salt), phosphates of lime and
 Matter. { soda, etc.

Functions of Nutrients.

Having discussed the classes of nutrients as they occur in foods, the question may be asked: What offices do these nutrients perform in the animal economy?

Water is not a nutrient in the sense in which the term is here used, though the animal body cannot be supported without it.

The ash, or mineral matter, furnishes the material for the bony structure of the body, and, to a far less extent, of the soft tissues. Most of our foods and rations contain an abundant supply of the mineral elements, so little or no notice need be taken of them in feeding.

Protein differs from all the other nutrients in containing the element nitrogen, and is the producer of flesh, ligaments, muscles, tendons, sinews, hair, hide and all portions of the animal machine which have strength, except the bones. The protein bodies are of the utmost importance in the animal structure. They compose the larger part of the animal machinery, and are the exclusive source of its repair as occasioned by the continuous wear and tear of the system, due to the internal and external movements of the body;

they are the basis of blood, and the source of casein in milk; and in the absence of sufficient quantities of fats and carbohydrates in the food for the production of heat and energy, they are transformed into fats, and perform the office of fats in nutrition. This latter transformation may also result from an excess of protein. The heat-producing power of protein is but little different from that of carbohydrates; the amount of fat it produces is probably much less, while, as a heat-producer, fat is worth about 2.25 times as much as protein. These facts, combined with the high cost of protein in foods, render it usually uneconomical to feed protein for the production of fat to be either stored in the body as such, or to be used as fuel, since the fats and carbohydrates perform these offices, and cost much less. It is to be remembered that the protein bodies are the "flesh formers," and though they can perform the offices of fats and carbohydrates in nutrition, fats and carbohydrates cannot take the place of protein.

Fats and carbohydrates perform the same offices in the body—those of the production of heat to keep the body warm, and the force by which the animal mechanism is run. They are the "heat and force producers," and are consumed in the body as fuel, giving out heat, muscular and intellectual energy. For the production of heat and energy one pound of fat is worth about 2.25 times as much as a pound of carbohydrates. Fats give out about 2.25 times the heat that carbohydrates do. Besides serving as heat and force producers, carbohydrates are converted in the animal body into fats, and, together with the fats of the food, are stored as such in fatty tissue. The value of carbohydrates for the production of fats is supposed to be in about the same proportion as the heat-producing powers of carbohydrates to fats.

Carbohydrates are not found in the animal body as such, but are converted into fats. There are, therefore, only four classes of substances composing the animal body, viz.: water, ash, fats and protein.

The main and distinctive offices of the nutrients of foods are:

Ash, or mineral constituents, are bone producers; the protein bodies are the flesh formers; and fats and carbohydrates are the heat and force producers. The nutrients already located in the animal body perform the same offices as the corresponding ones of foods. In case of a deficiency of nutrients in foods given, the fats, or protein and fats, are drawn upon to assist in running the animal machine. Carbohydrates and fats, in being consumed, prevent the consumption of protein, but so soon as they become insufficient to supply the necessary heat and force for the body, protein substance, in the form of lean meat, muscle, etc., are drawn upon. A sufficient supply of carbohydrates and fats is, therefore, necessary to the protection of the animal frame-work. The following is a statement of the

Functions of Food in the Animal Body.

Food nourishes and supports the body

By supplying—

- 1. The materials of which it is made.
 - 2. The materials to repair its waste and wear.
- By producing—
- 3. Heat to keep it warm.
 - 4. Force and energy for muscular and other work.

These offices are performed by the nutrients:

Protein.....	{ Which is the basis of blood, lean meat, tendons, ligaments, sinews, hair, skin, etc. Is converted into fats. Is used as fuel for heat and force.
Fats.....	{ Are used as fuel for heat and force. Are stored in the fatty tissue of the body.
Carbohydrates (N.-free Ext. and Crude Fiber)	{ Are converted into fats and stored in the body, or Are used as fuel for heat and force.
Mineral Matter.	{ Forms bone and a very small part of muscular and fatty tissues.

Classification of Feeding Stuffs.

Feeding stuffs may be classified as follows:

No. 1.	No. 2.	No. 3.	No. 4.
Very high in Protein—above 40 per cent.	Rich in Protein—25 to 40 per cent.	Fairly rich in Protein—12 to 25 per cent.	Poor in Protein—below 12 per cent.
Cotton-seed meal. Dried blood. Meat scraps.	Linseed meal. Gluten meal. Soja beans. Buckwheat middlings.	Wheat shorts. Wheat bran. Wheat middlings. Cow-peas. Pea meal. Oat shorts. Rye shorts. Gluten feed.	Rice polish. Hominy chops. Wheat. Oats. Rye. Rice. Corn. Hays, stover, etc.

Value of Concentrated Feeds.

The value of feeding materials depends, first, on their composition, which has already been discussed, and second, on their

Digestibility.—All feed eaten by an animal is not digested and used in nutrition, but only that portion which is dissolved by the alimentary agents and taken into the circulation of the system, the

portion which is assimilated. The residue, or undigested portion, forms the solid excrement of the animal. The digestibility of most of our common feeds has been determined by actual feeding trials as indicated above, and may be found in the Bulletins issued by the Department and the Experiment Station. It is not necessary to repeat them here.

The Uses of a Chemical and Microscopical Examination of Feeding Stuff.

A chemical examination shows:

First. The percentage of protein, fat, crude fiber, ash, moisture, etc., contained in the feed.

Second. Whether or not the feed is up to guarantee claimed for it.

Third. Indicates whether or not the feed is adulterated.

Fourth. Furnishes data for dairymen and stockmen to calculate and compound rations.

A microscopical examination shows whether or not the feed contains any adulterants and what the adulterants are.

Analyses of Samples of Concentrated Feeding Stuff—Season 1906.

On the following pages will be found the results of the chemical and microscopic examinations of the samples of concentrated stock feeds collected by the inspectors of the Department, and those sent in by farmers, dealers and manufacturers. These analyses, with the discussion of the results which follow them, are deserving of careful consideration on the part of all local dealers and also feeders.

WHEAT BRAN.

Wheat bran is the by-product from the manufacture of flour. It carries a considerable amount of crude fiber somewhat resembling straw in this particular.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1284	Bran	Acme Mills and Elevator Co., Hopkinsville, Ky.	D. L. Gore Co., Wilmington, N. C.	Jan. 20 1906	\$ 1.30
1183	do	Adams Grain and Provision Co., Charlotte, N. C.	Adams Grain and Provision Co., Charlotte, N. C.	-----	-----
1172	do	do	H. L. Trotter, Reidsville, N. C.	-----	-----
1170	do	do	W. A. Stacy, Reidsville, N. C.	Feb. 5 1906	-----
1388	do	Ashboro Roller Mills, Ashboro, N. C.	N. Tomlinson, Troy, N. C.	Aug. 4 1906	-----
1403	do	Ballard & Ballard, Louisville, Ky.	Caldwell & Carlyle, Lumberton, N. C.	Sept. 3 1906	-----
1238	do	do	J. A. Meadows, New Bern, N. C.	Jan. 18 1906	-----
1237	do	do	J. Havens, Washington, N. C.	-----	-----
1290	do	Burlington Flour Mills, Burlington, N. C.	Burlington Flour Mills, Burlington, N. C.	Mar. 15 1906	-----
1199	do	Concord Milling Co., Concord, N. C.	Concord Milling Co., Concord, N. C.	Feb. 20 1906	-----
1189	do	Crown Milling Co., Ashboro, N. C.	Crown Milling Co., Ashboro, N. C.	Feb. 9 1906	-----
1320	do	Dunlop Mills, Richmond, Va.	F. M. Carlton, Durham, N. C.	April 13 1906	1.35
1233	do	do	McLaurin & Shaw, Red Springs, N. C.	Jan. 23 1906	-----
1208	do	Dixie Milling Co., High Point, N. C.	Dixie Milling Co., High Point, N. C.	Feb. 9 1906	-----
1196	do	Elon Roller Mills, Elon College, N. C.	T. H. McPherson	Feb. 16 1906	-----
1262	do	Henderson Roller Mill Co., Monroe, N. C.	L. M. Presson, Monroe, N. C.	Jan. 25 1906	-----
1366	do	Hickory Milling Co., Hickory, N. C.	Abernathy & Whitener, Hickory, N. C.	Aug. 2 1906	-----
1265	do	do	do	Feb. 1 1906	-----
1177	do	Hico Milling Co., Burlington, N. C.	R. L. & S. F. Spoon, Burlington, N. C.	Feb. 6 1906	-----
1273	do	Horne Bros. & Johnstone, Mocksville, N. C.	W. McNeil & Co., Mooresville, N. C.	Jan. 30 1906	-----
1184	do	do	Horne Bros. & Johnstone, Mocksville, N. C.	Feb. 7 1906	-----
1164	do	do	do	Feb. 1 1906	-----
1419	do	Julian Milling Co., Julian, N. C.	Julian Milling Co., Julian, N. C.	Oct. 1 1906	-----
1386	do	Liberty Mills, Nashville, Tenn.	Shamberger & Page, Biscoe, N. C.	Aug. 16 1906	-----
1252	do	do	John S. McEachern, Wilmington, N. C.	Jan. 16 1906	-----
1153	do	do	F. T. Meacham, Statesville, N. C.	Jan. 16 1906	-----
1318	Mixed bran	Mountain City Mill Co., Chattanooga, Tenn.	W. H. Proctor, Durham, N. C.	April 13 1906	1.30
1229	do	do	J. E. Fain, Murphy, N. C.	Feb. 7 1906	-----
1397	Bran	Moore Milling Co., Hickory, N. C.	Hickory, N. C.	Aug. 27 1906	-----
1225	do	Read Bros., Morristown, Tenn.	Newark Grocery, Asheville, N. C.	Feb. 5 1906	-----
1407	do	Southern Mills, Nashville, Tenn.	J. P. Wyatt & Bro., Raleigh, N. C.	Sept. 4 1906	-----
1254	do	Statesville Flour Mills, Statesville, N. C.	D. J. Kimball, Statesville, N. C.	Jan. 31 1906	-----
1169	do	J. Allen Smith, Knoxville, Tenn.	Hutchison Bros., Reidsville, N. C.	Feb. 5 1906	-----
1143	do	Star and Crescent Milling Co., South Chicago, Ill.	Star and Crescent Milling Co., South Chicago, Ill.	Nov. 28 1905	-----

It differs from straw, however, in that the inner surface of the bran flakes is made up of the nutritious layer of the wheat grain, which is rich in protein and fat. To be of good quality it should contain 15½ per cent protein.

OF BRANS NOT FOUND ADULTERATED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1284	100	15.25	5.40	8.50	-----	15.37	4.46	9.48	6.43	8.09	56.17	Wheat product.
1183	-----	-----	-----	-----	-----	11.40	4.45	15.34	8.32	7.73	52.76	do.
1172	-----	14.50	4.00	9.00	-----	11.12	3.46	8.12	4.85	7.25	65.20	do.
1170	100	14.50	4.10	9.05	-----	14.87	5.37	5.33	4.89	7.70	61.84	do.
1388	-----	-----	-----	-----	-----	14.81	-----	8.57	6.65	11.28	-----	do.
1403	100	12.25	4.60	9.08	-----	14.37	4.53	12.96	5.62	10.02	52.50	do.
1238	100	16.58	4.82	8.04	-----	16.75	4.44	9.54	6.41	4.40	58.46	do.
1237	100	15.25	4.43	8.40	-----	15.12	4.55	9.96	6.40	6.84	57.13	do.
1290	100	-----	-----	-----	-----	15.62	3.65	6.95	6.28	9.44	58.06	do.
1199	-----	-----	-----	-----	-----	15.52	4.30	7.40	5.51	9.20	57.57	do.
1189	80	-----	-----	-----	-----	15.50	4.00	8.60	-----	-----	-----	do.
1320	100	14.50	4.00	9.50	-----	14.12	4.67	9.01	1.53	9.57	61.10	do.
1233	100	14.50	4.00	9.50	-----	14.75	4.60	7.70	4.94	6.33	61.68	do.
1208	80	14.50	4.10	8.10	-----	15.37	4.17	4.81	3.68	9.18	62.79	do.
1196	-----	-----	-----	-----	-----	15.90	4.37	9.30	6.41	8.88	55.14	do.
1262	100	16.10	4.20	6.75	-----	14.75	4.81	7.70	6.54	7.86	58.34	do.
1366	-----	-----	-----	-----	-----	15.00	3.90	7.54	5.92	11.06	56.58	do.
1265	100	14.50	4.00	9.50	-----	14.37	4.75	5.87	4.68	8.30	62.03	do.
1177	-----	-----	-----	-----	-----	14.75	4.36	9.08	6.38	9.88	55.55	do.
1273	100	-----	-----	-----	-----	14.75	4.38	6.14	6.38	8.58	59.68	do.
1184	-----	-----	-----	-----	-----	-----	-----	9.38	8.62	8.38	-----	do.
1164	-----	-----	-----	-----	-----	15.75	3.70	8.20	-----	-----	-----	do.
1419	-----	-----	-----	-----	-----	16.00	4.17	5.60	4.55	11.57	58.11	do.
1386	100	14.50	4.00	9.00	-----	14.25	5.44	8.26	3.88	12.09	56.07	do.
1252	100	14.50	4.00	9.50	-----	15.50	4.33	10.10	5.98	8.16	55.93	do.
1153	-----	-----	-----	-----	-----	18.27	5.73	7.94	-----	-----	-----	do.
1318	100	12.50	3.50	8.50	-----	15.00	4.66	7.88	4.67	9.19	58.60	Wheat bran and corn bran.
1229	80	12.50	3.50	8.50	-----	13.12	4.45	10.96	6.12	6.94	58.41	Wheat bran and a small amount of corn bran.
1397	100	14.50	4.00	8.00	-----	16.00	-----	6.17	3.79	10.53	-----	Wheat product.
1225	80	18.00	3.50	8.00	-----	14.37	3.70	8.56	5.49	6.25	61.63	do.
1407	100	14.50	4.00	9.50	-----	14.62	4.01	8.96	5.75	11.18	55.48	do.
1254	100	17.50	3.50	7.25	-----	14.87	4.67	9.44	7.08	7.39	66.55	do.
1169	80	14.50	4.00	9.50	-----	15.37	4.75	9.78	6.64	7.58	55.91	do.
1143	-----	-----	-----	-----	-----	18.50	4.98	4.87	-----	-----	-----	do.

RESULTS OF THE EXAMINATION OF BRANS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1142	Bran -----	Star and Crescent Milling Co., South Chicago, Ill.	Star and Crescent Milling Co., South Chicago, Ill.	Nov. 28 1905	\$-----
1249	do -----	J. Allen Smith, Knoxville, Tenn.	T. P. Nash, Elizabeth City, N. C.	Jan. 9 1906	-----
1335	do -----	Pillsbury, Minneapolis, Minn.	H. Schaffer, Mt. Airy, N. C.	April 18 1906	-----
1325	do -----	Piedmont Mills, Lynchburg, Va.	The Patterson Co., Greensboro, N. C.	April 14 1906	1.30
1258	do -----	do -----	W. B. Cooper, Wilmington, N. C.	-----	-----
1418	do -----	Geo. P. Plant Milling Co., St. Louis.	Geo. P. Plant Milling Co., St. Louis, Mo.	Oct. 1906	1-----
1417	do -----	Tri-State Milling Co., Nashville, Tenn.	Tri-State Milling Co., Nashville, Tenn.	Oct. 1906	1-----
1248	do -----	Tennessee Mill Co., Estill Springs.	G.W. Patterson, Concord, N. C.	Jan. 20 1906	-----
1332	do -----	J. H. Walker & Co., Reidsville, N. C.	G. C. Welsch, Mt. Airy, N. C.	April 18 1906	1.35
1295	do -----	Walkertown Milling Co., Walkertown, N. C.	Walkertown Milling Co., Walkertown, N. C.	Mar. 15 1906	-----
1294	do -----	do -----	do -----	Mar. 15 1906	-----

DISCUSSION OF RESULTS.

Fifty-six (56) samples of bran were examined.

Forty-four (44) were pure-wheat products, while twelve (12) were mixed brans.

ADULTERATED WHEAT BRAN.

These feeds were branded or marked wheat bran or bran, leading the prospective purchaser to believe that they were pure-wheat products.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1166	Bran -----	Adams Grain and Provision Co., Charlotte, N. C.	J. H. Walker & Co., Reidsville, N. C.	Feb. 5 1906	-----
1228	do -----	Asheville Milling Co., Asheville, N. C.	Carpenter Bros., Kings Mountain, N. C.	Feb. 14 1906	-----
1277	do -----	Clyde Roller Mills, Clyde, N. C.	C. H. Ray, Waynesville, N. C.	Feb. 5 1906	-----
1414	do -----	Hickory Milling Co., Hickory, N. C.	Phillips & Penny, Raleigh, N. C.	Sept. 4 1906	-----
1387	do -----	Mayo Milling Co., Richmond, Va.	Cash Grocery Co., Troy, N. C.	Aug. 16 1906	-----
1363	do -----	Sparger Mill Co., Bristol, Tenn.	D. J. Lybrook, Banner, N. C.	May 14 1906	-----
1303	do -----	-----	E. W. Paddison, Mount Airy, N. C.	Mar. 7 1906	-----
1240	do -----	Plott & Osborne Milling Co., Canton, N. C.	J. L. Smathers, Murphy, N. C.	Feb. 5 1906	-----

DISCUSSION OF RESULTS.

Sample 1303 is adulterated with about 50 per cent of finely-ground corn-cobs. Its protein content is 8.25 per cent, which is about half as much as is present in pure-wheat bran. This feed when sampled for analysis was being offered for sale as a pure-wheat bran.

NOT FOUND ADULTERATED.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1142	-----	-----	-----	-----	-----	18.25	4.34	9.49	-----	-----	-----	Wheat product.
1249	100	14.50	4.00	9.50	-----	15.87	4.64	7.54	5.64	6.85	59.46	do.
1335	100	-----	-----	-----	-----	11.25	4.71	7.95	5.87	8.87	61.35	do.
1325	100	14.50	4.00	9.50	-----	13.25	5.55	7.67	6.46	8.84	58.83	do.
1258	100	14.50	4.00	9.50	-----	15.00	4.37	9.46	7.22	8.45	55.50	do.
1418	-----	-----	-----	-----	-----	14.75	4.86	8.59	6.07	5.76	59.97	do.
1417	-----	-----	-----	-----	-----	13.87	5.26	7.43	4.47	10.85	68.12	do.
1248	100	14.50	4.00	6.00	-----	15.00	4.26	9.55	5.62	6.22	59.35	do.
1332	100	16.87	4.48	8.00	-----	15.00	4.38	7.96	6.07	9.55	57.04	do.
1295	-----	-----	-----	-----	-----	15.00	4.51	9.32	5.62	8.91	56.74	do.
1294	-----	-----	-----	-----	-----	16.25	4.45	6.94	4.00	9.66	58.70	do.

Of the pure samples ten (10) were below the standard of 14.50 per cent of protein, while five (5) were below the standard of 4.00 per cent fat. The eight (8) mixed samples will be found under the heading of adulterated brans. Four (4) samples were marked mixed bran and had the proper guarantee and tax tag attached.

They were found to contain other substances than indicated, and hence are classed as adulterated and misbranded.

Feeds of this class must be branded and sold as mixed bran and must be accompanied by a guaranteed analysis on each bag or on a tag attached thereto.

OF BRANS FOUND ADULTERATED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1166	100	-----	-----	-----	-----	10.50	3.31	18.55	5.16	7.61	54.87	Wheat bran adulterated with corn-cobs.
1228	80	13.00	3.00	9.50	-----	15.00	4.46	7.34	5.75	7.22	60.23	Wheat bran and corn bran.
1277	80	12.50	4.50	7.50	-----	12.50	4.30	6.96	4.80	7.15	64.29	Wheat bran and corn bran.
1414	-----	15.00	4.00	6.00	-----	13.87	4.85	6.89	3.97	10.54	-----	Wheat bran and corn bran.
1387	80	16.00	3.00	-----	-----	13.00	6.52	8.15	5.38	11.04	59.88	Wheat bran and corn bran.
1363	-----	-----	-----	-----	-----	14.25	5.81	7.95	4.77	9.57	57.65	Wheat bran and corn bran.
1303	-----	-----	-----	-----	-----	8.25	3.28	19.73	3.86	-----	-----	Wheat bran and finely-ground corn-cobs.
1240	80	12.50	4.46	9.36	-----	13.37	4.88	9.52	3.76	5.64	62.83	Wheat bran and corn bran.

Sample 1166 was also found adulterated with finely-ground corn-cobs, and in consequence was found to be low in protein and high in crude fiber.

The other samples examined were mixtures of wheat bran and corn bran. The amount of corn bran used can be ascertained to some extent by the percentage of protein these feeds contain.

WHEAT MIDDINGS AND SHORTS.

The terms "middlings" and "shorts" are frequently used interchangeably. Some of the middlings have been found to be made up of re-ground bran, occas-

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1205	Middlings-----	Adams Grain and Provision Co., Richmond, Va.	Adams Grain and Provision Co., Richmond, Va.	Feb. 21 1906	\$-----
1171	do-----	do-----	H. J. Martin, Reidsville, N. C.	Feb. 5 1906	-----
1381	do-----	Andrew Bowling, Staunton, Va.	Griffin & Bynum, Sanford, N. C.	Aug. 10 1906	-----
1182	do-----	do-----	E. H. Lawrence, Durham, N. C.	Feb. 6 1906	-----
1194	do-----	Ashboro Roller Mills, Ashboro, N. C.	Ashboro Roller Mills, Ashboro, N. C.	Feb. 9 1906	-----
1195	do-----	do-----	do-----	Feb. 16 1906	-----
1227	do-----	Asheville Milling Co., Asheville, N. C.	Stradley & Luther, Asheville, N. C.	Feb. 5 1906	-----
1188	Shorts-----	Crown Milling Co., Ashboro, N. C.	Crown Milling Co., Ashboro, N. C.	Feb. 9 1906	-----
1286	do-----	Cumberland Mills, Nashville, Tenn.	R. T. Willis, Morehead City, N. C.	Jan. 17 1906	-----
1323	do-----	Eagle Flour Mill Co., Sweetwater, Tenn.	I. A. Burnett & Son, Durham, N. C.	April 13 1906	1.10
1328	Red Dog Middlings	Eagle Roller Mills, New Ulm, Minn.	G. L. Dull & Co., Winston, N. C.	April 16 1906	1.50
1178	Middlings-----	S. F. Fairbanks (jobber), Richmond, Va.	J. A. Isley & Co., Burlington, N. C.	Feb. 1906	-----
1331	Red Dog Middlings	do-----	Farmers Trade House, Winston, N. C.	April 16 1906	1.50
1356	Shorts-----	Hickory Milling Co., Hickory, N. C.	Bost & Newton, Hickory, N. C.	April 25 1906	1.50
1368	do-----	do-----	Hickory Milling Co., Hickory, N. C.	Sept. 2 1906	-----
1266	do-----	Hickory Milling Co., Hickory, N. C.	Abernethy & Whitener, Hickory, N. C.	Feb. 1 1906	-----
1287	Middlings-----	Hubbard Milling Co., Mancelona, Minn.	Adams Grain and Provision Co., Charlotte, N. C.	Feb. 17 1906	-----
1399	do-----	Hunter Bros. Milling Co., St. Louis, Mo.	J. B. Buchanan, Jonesboro, N. C.	Aug. 1 1906	-----
1140	do-----	Robert Johnston, Norfolk, Va.	Robert Johnston, Norfolk, Va.	Oct. 27 1906	-----
1420	Shorts-----	Julian Milling Co., Julian, N. C.	Julian Milling Co., Julian, N. C.	Oct. 1 1906	-----
1404	do-----	Liberty Mills, Nashville, Tenn.	R. E. Lee, Laurinburg, N. C.	Sept. 4 1906	-----
1392	do-----	do-----	H. C. Watson, Rockingham, N. C.	Jan. 4 1906	-----
1251	do-----	do-----	Alston Co., Louisburg, N. C.	Jan. 3 1906	-----
1400	do-----	do-----	L. H. Caldwell, Lumberton, N. C.	Sept. 3 1906	-----
1161	Middlings-----	Northwestern Consol. Milling Co., Minneapolis, Minn.	John S. McEachern, Wilmington, N. C.	Jan. 19 1906	-----
1278	do-----	do-----	R. J. Willis, Morehead City, N. C.	Jan. 17 1906	-----
1279	Shorts-----	do-----	Parham Bros., Henderson, N. C.	Jan. 5 1906	-----
1365	Middlings-----	Gambill & Davis, Roanoke, Va.	Peoples Fuel and Ice Co., Winston-Salem, N. C.	July 17 1906	-----
1304	do--(Red Dog)	Piedmont Mill, Lynchburg, Va.	Piedmont Mill, Lynchburg, Va.	-----	-----
1385	do--(Pillsbury Daisy)	do-----	J. B. Yates, Biscoe, N. C.	Aug. 16 1906	-----
1333	do-----	do-----	G. C. Welsch, Mt. Airy, N. C.	April 18 1906	-----
1175	Middlings (Pillsbury XX Daisy)	do-----	O. F. Pearce, Greensboro, N. C.	Feb. 5 1906	-----
1409	Middlings-----	Geo. P. Plant Milling Co., St. Louis, Mo.	W. A. Myatt, Raleigh, N. C.	July 4 1906	-----
1384	do-----	James Quick Milling Co., Minneapolis, Minn.	W. L. London & Son, Pittsboro, N. C.	Aug. 11 1906	-----
1224	do----- (R. R.)	Adams Grain and Provision Co., Richmond, Va.	Adams Grain and Provision Co., Richmond, Va.	Feb. 5 1906	-----

ionally mixed with other products. Middlings are rich in protein and low in fiber, and for this reason are very excellent feed for hogs. The name middlings and shorts indicate that the feed is an all-wheat product, but sometimes they are mixed with other substances, and when they are mixed their feeding value, in most cases, is reduced.

OF MIDLINGS AND SHORTS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Mois- ture.	Nitro- gen Free Extract.	
1205	-----	-----	-----	-----	-----	17.07	5.03	1.85	3.09	11.00	61.96	Wheat product.
1171	-----	-----	-----	-----	-----	17.65	4.98	2.55	3.09	7.60	64.13	do.
1381	100	15.00	4.00	6.00	-----	14.87	-----	6.99	1.42	10.65	-----	do.
1182	100	15.00	4.00	6.00	-----	16.87	4.86	3.30	4.21	8.35	62.41	do.
1194	-----	-----	-----	-----	-----	16.81	5.00	3.26	-----	-----	-----	do.
1195	-----	-----	-----	-----	-----	16.00	4.17	4.10	7.60	10.47	57.66	do.
1227	80	16.00	4.44	3.43	-----	14.61	4.15	2.45	3.74	6.31	68.74	do.
1188	70	-----	-----	-----	-----	16.18	4.72	3.45	2.42	8.91	64.32	do.
1286	100	16.00	4.00	6.42	-----	17.50	5.75	6.50	4.06	7.34	58.85	do.
1323	80	16.50	5.75	5.50	-----	16.37	5.49	6.04	8.18	6.27	57.65	do.
1328	100	-----	-----	-----	-----	18.00	4.65	2.41	2.10	7.18	65.66	do.
1178	100	-----	-----	-----	-----	15.12	5.41	8.21	4.89	8.15	58.22	do.
1331	100	20.00	4.50	3.00	-----	18.12	3.83	1.96	2.56	6.00	67.53	do.
1356	100	15.00	4.00	6.00	-----	15.25	5.12	6.02	1.78	7.64	64.29	do.
1368	-----	-----	-----	-----	-----	14.75	2.60	2.75	2.49	11.83	65.58	do.
1266	100	15.00	4.00	6.00	-----	14.25	4.59	1.63	2.37	7.24	69.92	do.
1287	100	-----	-----	-----	-----	17.87	5.95	8.00	5.14	7.31	55.73	do.
1399	100	15.75	4.00	-----	-----	17.00	5.38	6.05	4.80	10.15	56.62	do.
1140	-----	-----	-----	-----	-----	16.00	4.31	8.83	-----	-----	-----	do.
1420	-----	-----	-----	-----	-----	13.37	-----	6.30	.95	11.08	-----	do.
1404	100	16.00	4.00	6.42	-----	16.37	5.53	4.29	7.12	10.58	56.11	do.
1392	100	16.00	4.00	6.42	-----	16.62	5.99	5.97	3.76	11.68	55.96	do.
1251	100	16.00	4.00	6.42	-----	17.75	6.36	5.06	3.65	9.63	57.55	do.
1400	100	16.00	4.00	6.49	-----	16.87	5.74	4.05	3.92	9.71	59.71	do.
1161	-----	-----	-----	-----	-----	15.83	5.47	10.66	-----	-----	-----	do.
1278	100	-----	-----	-----	-----	16.62	5.52	5.65	4.78	6.08	61.35	do.
1279	100	14.50	4.00	8.00	-----	15.87	4.87	6.00	4.52	8.50	60.24	do.
1365	-----	-----	-----	-----	-----	17.87	4.69	3.38	3.63	10.70	59.73	do.
1304	-----	-----	-----	-----	-----	15.75	4.07	1.77	1.81	6.75	69.65	do.
1385	100	-----	-----	-----	-----	14.50	4.63	5.69	4.85	11.61	58.64	do.
1333	100	20.00	4.50	3.90	-----	19.37	5.69	8.05	3.26	6.28	57.35	do.
1175	100	-----	-----	-----	-----	16.12	-----	2.46	2.87	13.75	-----	do.
1409	100	17.11	4.41	5.18	-----	16.12	6.13	6.13	9.26	11.19	51.17	do.
1384	-----	17.25	5.25	-----	-----	17.12	4.33	7.10	4.82	11.55	55.06	do.
1224	80	13.50	4.50	4.50	-----	17.50	5.45	5.08	3.74	6.85	61.36	do.

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1268	Middlings-----	Riverton Mills Co., Riverton, Va.	E. D. Worley, Monroe, N. C.	Jan. 25 1906	\$-----
1275	----do-----	Royal Milling Co., Minneapolis, Minn.	J. F. Johnson, Gastonia, N. C.	Feb. 15 1906	-----
1214	Shorts-----	Southern Mills, Nashville, Tenn.	Southern Mills, Nashville, Tenn.	Jan. 10 1906	-----
1382	----do-----	-----do-----	Hunter Mercantile Co., Sanford, N. C.	Aug. 10 1906	-----
1144	Middlings (Star)-----	Star and Crescent Milling Co., South Chicago, Ill.	Star and Crescent Milling Co., South Chicago, Ill.	Nov. 23 1906	-----
1141	Middlings (Crescent).-----	-----do-----	-----do-----	Nov. 28 1906	-----
1179	Middlings (Star and Crescent).-----	-----do-----	Parker-Harris Co., Durham, N. C.	Feb. 6 1906	-----
1406	Middlings-----	Star Mills, Nashville, Tenn.	McLaurin & Shaw, Laurinburg, N. C.	Aug. 4 1906	-----
1276	----do-----	Stuarts Draft Milling Co., Stuarts Draft, Va.	J. F. Dixon, Littleton, N. C.	Jan. 6 1906	-----
1247	----do-----	Tennessee Mill Co., Estill Springs, Tenn.	G. W. Patterson, Concord, N. C.	Feb. 20 1906	-----
1416	Shorts-----	Tri-State Milling Co., Nashville, Tenn.	Tri-State Milling Co., Nashville, Tenn.	Oct. 2 1906	-----
1168	Middlings (Adrian).-----	-----do-----	Hutchison Bros., Reidsville, N. C.	Feb. 5 1906	-----
1243	Middlings-----	-----do-----	Glenn & Carroll, Concord, N. C.	Feb. 20 1906	-----
1324	----do-----	White Star Mills, Staunton, Va.	A. K. Ferrall, Durham, N. C.	April 4 1906	1.45
1296	Shorts-----	Walkertown Milling Co., Walkertown, N. C.	Walkertown Milling Co., Walkertown, N. C.	Mar. 16 1906	-----

DISCUSSION OF RESULTS.

Fifty-one (51) samples of middlings or shorts were examined, and all were

BRAN AND SHORTS.

When a feed is marked "Bran and Shorts" it is supposed to be made up of

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1206	Bran and shorts (M)-----	Adams Grain and Provision Co., Richmond, Va.	Adams Grain and Provision Co., Richmond, Va.	Feb. 6 1906	\$-----
1204	----do (R. R.)-----	-----do-----	-----do-----	-----	-----
1203	----do (R.)-----	-----do-----	-----do-----	-----	-----
1201	----do (D.)-----	-----do-----	-----do-----	-----	-----
1373	----do-----	China Grove Roller Mills, China Grove, N. C.	China Grove Roller Mills, China Grove, N. C.	-----	-----
1165	----do-----	City Roller Mill, Statesville, N. C.	City Roller Mill, Statesville, N. C.	Jan. 30 1906	-----
1152	----do-----	Deep River Roller Mill, High Point, N. C.	Deep River Roller Mill, High Point, N. C.	-----	-----
1352	----do-----	Lexington Roller Mill, Lexington, N. C.	Spencer Supply Co., Spencer, N. C.	-----	-----
1226	----do-----	Mecklenburg Roller Mills, Charlotte, N. C.	R. C. Kennedy, Bessemer City, N. C.	Feb. 14 1906	-----
1271	----do-----	Moore Milling Co., Hickory, N. C.	McComb Bros., Hickory, N. C.	Feb. 1 1906	-----
1374	----do-----	-----	C. W. Thayer, Sons & Co., Thomasville, N. C.	Sept. 10 1906	-----

DISCUSSION OF RESULTS.

Of the eleven (11) samples of pure bran and shorts examined, three (3) were

MIDLINGS AND SHORTS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1268	100	16.35	3.96	4.42	-----	14.87	3.97	3.90	2.67	8.39	66.20	Wheat product.
1275	100	18.00	4.00	8.00	-----	17.37	5.74	6.94	5.00	7.75	57.20	do.
1214	100	16.00	4.00	6.42	-----	16.87	5.75	6.42	4.37	8.56	58.03	do.
1382	100	16.00	4.00	6.42	-----	16.75	5.29	6.03	4.46	10.04	67.43	do.
1144	-----	-----	-----	-----	-----	19.87	4.99	6.40	-----	-----	-----	do.
1141	-----	-----	-----	-----	-----	20.62	5.35	5.28	-----	-----	-----	do.
1179	-----	-----	-----	-----	-----	-----	-----	-----	7.60	7.70	-----	do.
1406	100	16.00	4.00	6.42	-----	17.75	-----	1.15	3.79	11.00	-----	do.
1276	100	15.00	4.00	-----	-----	11.00	1.75	1.18	1.43	8.67	75.97	do.
1247	100	16.00	4.00	5.00	-----	16.87	5.30	5.14	3.99	6.13	62.57	do.
1416	-----	-----	-----	-----	-----	16.62	4.02	6.04	3.08	10.24	60.00	do.
1168	100	20.00	4.50	3.00	-----	13.75	5.19	3.34	3.09	7.93	66.70	do.
1243	100	17.88	4.62	-----	-----	16.12	5.53	5.06	2.62	5.80	64.67	do.
1324	100	15.00	4.00	6.00	-----	14.60	3.62	7.05	1.26	9.30	64.17	do.
1296	-----	-----	-----	-----	-----	15.87	1.75	1.50	1.64	10.05	69.19	do.

found pure-wheat products. Four (4) samples were below the standard of 14.50 per cent protein and five (5) below the standard of 4.00 per cent fat.

pure bran and shorts run together. It cannot be marked "Bran and Shorts" if it contains anything except pure wheat products.

TION OF BRAN AND SHORTS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1206	-----	-----	-----	-----	-----	17.50	4.42	5.07	7.17	6.86	58.98	Wheat product.
1204	-----	-----	-----	-----	-----	17.50	6.87	5.17	3.97	6.23	60.26	do.
1203	-----	-----	-----	-----	-----	18.50	6.42	6.12	4.35	7.38	57.23	do.
1201	-----	-----	-----	-----	-----	16.00	4.74	5.98	3.04	7.50	62.74	do.
1373	-----	-----	-----	-----	-----	13.37	3.71	4.50	3.79	-----	-----	do.
1165	100	-----	-----	-----	-----	15.37	4.49	5.42	3.90	7.71	63.11	do.
1152	-----	-----	-----	-----	-----	14.62	3.45	4.95	-----	-----	-----	do.
1352	-----	18.25	4.86	6.47	-----	15.12	5.00	7.04	3.90	5.85	63.09	do.
1226	-----	16.56	4.99	7.53	-----	16.00	4.87	7.20	5.78	6.75	59.40	do.
1271	100	14.50	4.00	8.00	-----	16.50	4.72	5.35	4.44	8.84	60.15	do.
1374	-----	-----	-----	-----	-----	16.50	5.05	6.88	5.01	13.93	53.16	do.

found below the standard of 14.50 per cent protein and two (2) below the standard of 4.00 per cent fat.

A majority of these samples, however, are of good quality, as they carry a high per cent of protein and fat.

ADULTERATED BRAN AND SHORTS.

The eleven (11) samples of bran and shorts in the following table were found by Department inspectors being offered for sale as pure bran and shorts or bran and shorts.

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1222	Bran and shorts	Acme Milling Co., Talbot, Tenn.	Hyatt & Rhinehardt, Waynesville, N. C.	Feb. 6 1906	-----
1210	---do---	A. W. Fuller, Fullers, N. C.	-----	Aug. 10 1906	-----
1367	---do---	Hickory Milling Co., Hickory, N. C.	-----	-----	-----
1378	---do---	Newport Mill Co., Newport, Tenn.	-----	-----	-----
1360	---do---	---do---	Overman & Co., Salisbury, N. C.	-----	-----
1359	---do---	---do---	Asheville Grocery Co., Asheville, N. C.	April 26 1906	-----
1315	---do---	---do---	-----	-----	-----
1256	---do---	---do---	Davidson & Wolfe, Charlotte, N. C.	Feb. 17 1906	-----
1255	---do---	Statesville Flour Mills, Statesville, N. C.	W. P. McClain, Statesville, N. C.	Jan. 31 1906	-----
1347	---do---	---do---	I. Lippmann, Salisbury, N. C.	April 21 1906	-----
1353	---do---	---do---	Southern Cotton Mill Store, Bessemer City, N. C.	April 23 1906	-----

DISCUSSION OF RESULTS.

A careful examination of the above table and a comparison of the figures in this table with those under the head of pure bran and shorts will indicate the true quality of these feeds.

SHIPSTUFF.

This is a name that applies to a mixture of no definite composition. It generally indicates a finely ground product, which may be an all-wheat product or a

RESULTS OF THE EXAMIN

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1242	Shipstuff	Adams Grain and Provision Co., Charlotte, N. C.	Southern Cotton Mill Store, Bessemer City, N. C.	Feb. 14 1906	-----
1241	---do---	---do---	Beacom Supply Co., Henderson, N. C.	Jan. 5 1906	-----
1218	---do (B.S.)---	Adams Grain and Provision Co., Richmond, Va.	Adams Grain and Provision Co., Richmond, Va.	-----	-----
1202	---do---	---do---	---do---	-----	-----
1405	---do---	Atlas Flour Mills, Milwaukee, Wis.	McNeil & Co., Red Springs, N. C.	Sept. 4 1906	-----
1357	---do---	Ballard & Ballard, Louisville, Ky.	Bost & Newton, Hickory, N. C.	April 4 1906	-----
1340	---do---	---do---	J. C. Henry, North Wilkesboro, N. C.	April 19 1906	-----
1236	---do---	---do---	Garrett & McNeil, Red Springs, N. C.	Jan. 22 1906	-----
1235	---do---	---do---	W. S. White & Co., Elizabeth City, N. C.	Jan. 9 1906	-----
1402	---do---	---do---	Caldwell & Carlyle, Lumberton, N. C.	Sept. 3 1906	-----

They are not bran and shorts, but mixtures of bran and shorts with other materials.

These being branded bran and shorts would lead one to believe they were pure-wheat products, which being not pure, forces the Department to class these as adulterated, especially in the light of the fact that none of them carried labels to show that they were not pure-wheat products.

ADULTERATED BRAN AND SHORTS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1222	80	16.00	5.00	7.47	-----	14.50	5.04	7.44	4.02	6.44	62.50	Wheat and corn product.
1210	-----	-----	-----	-----	-----	14.00	4.28	4.42	3.10	6.82	67.38	Wheat product and some corn.
1367	-----	17.57	2.37	6.02	-----	14.00	4.28	4.42	2.71	12.61	61.98	Wheat bran and corn bran.
1378	-----	-----	-----	-----	-----	11.40	4.75	4.95	4.40	12.60	62.00	Wheat bran and corn bran.
1360	-----	14.50	4.00	8.00	-----	13.74	4.76	7.11	4.19	8.45	61.75	Wheat bran and corn bran.
1359	80	14.50	4.00	8.00	-----	13.00	-----	7.01	3.56	6.21	-----	Wheat bran and corn bran.
1315	-----	-----	-----	-----	-----	14.25	4.60	6.47	3.71	10.21	60.76	Wheat bran and corn bran.
1256	80	14.50	4.00	8.00	-----	15.00	4.70	6.93	4.49	8.39	60.49	Wheat and corn product.
1255	80	15.00	5.00	6.00	-----	15.00	5.50	7.52	4.46	7.00	60.52	Wheat and corn product.
1347	80	15.00	5.00	6.00	-----	13.12	4.83	7.12	3.57	8.30	63.06	Wheat bran and corn bran.
1353	80	15.00	5.00	6.00	-----	14.25	4.97	11.01	3.89	8.54	57.86	Wheat bran and corn bran.

When corn bran is mixed with wheat feeds, as is the case in the above feeds, the quality of the feed is depreciated in proportion to the amount of corn bran added.

mixture with a wheat product as the basis and such other substances as finely ground corn bran, rice chaff, corn-cobs, and oat hulls.

Shipstuff is so fine that the adulterants cannot be seen with the naked eye, and this fact is taken advantage of by unscrupulous manufacturers.

ATION OF SHIPSTUFF.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1242	80	16.50	4.26	5.94	-----	16.12	3.46	9.62	0.47	7.54	62.79	Wheat product.
1241	100	15.00	4.00	6.00	-----	16.75	5.33	10.32	4.01	5.38	58.21	do.
1218	-----	-----	-----	-----	-----	17.87	5.77	7.20	3.93	6.27	58.96	do.
1202	-----	-----	-----	-----	-----	16.50	5.75	6.13	3.01	7.26	61.35	do.
1405	100	17.05	5.50	-----	-----	17.12	-----	8.03	9.11	11.19	-----	do.
1357	100	16.50	4.80	6.87	-----	16.12	4.94	5.37	4.08	8.52	60.97	do.
1340	100	16.50	4.80	6.80	-----	17.00	4.31	5.55	4.11	7.81	61.22	do.
1236	100	17.25	5.24	6.42	-----	17.00	4.65	9.99	3.25	6.07	59.04	do.
1235	100	17.37	4.41	5.83	-----	-----	4.40	9.58	4.41	6.09	-----	do.
1402	100	16.50	4.80	6.87	-----	16.12	4.63	5.63	7.65	9.70	56.27	do.

RESULTS OF THE EXAMIN

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1291	Shipstuff -----	Burlington Flour Mills, Burlington, N. C.	Burlington Flour Mills, Burlington, N. C.		\$-----
1396	----do -----	Dunlop Mills, Richmond, Va.	Rice & Folson, Hamlet, N. C.	Aug. 30	-----
1395	----do -----	do -----	A. S. Gowan, Hamlet, N. C.	Aug. 27	-----
1234	----do -----	do -----	Robert E. Lee, Laurinburg, N. C.	Jan. 23	-----
1198	----do -----	Douthat-Riddle Co., Danville, Va.	G. E. Leach, Raleigh, N. C.	Mar. 5	-----
1322	----do -----	Harrisonburg Milling Co., Harrisonburg, Va.	W. J. Harris & Co., Durham, N. C.	April 4	1.35
1259	----do -----	do -----	Laurinburg, N. C.	Jan. 4 1906	-----
1215	----do -----	do -----	Harrisonburg Milling Co., Harrisonburg, Va.		-----
1341	----do -----	High Point Milling Co., High Point, N. C.	J. W. Harris & Co., High Point, N. C.	April 20	-----
1176	----do -----	Hico Milling Co., Burlington, N. C.	R. L. & S. F. Spoon, Burlington, N. C.	Feb. 6	-----
1185	----do -----	Horne Bros. & Johnstone, Mocksville, N. C.	Horne Bros. & Johnstone, Mocksville, N. C.		-----
1213	----do -----	Knoxville City Mills, Knoxville, Tenn.	Knoxville City Mills, Knoxville, Tenn.		-----
1250	----do -----	do -----	McLean Bros., Gastonia, N. C.	Feb. 15 1906	-----
1391	----do -----	do -----	C. A. Porter, Rockingham, N. C.	Feb. 18 1906	-----
1223	----do -----	J. D. Manor & Co., New Market, Va.	Glenn & Carroll, Concord, N. C.	Feb. 20 1906	-----
1317	----do -----	do -----	E. H. Lawrence & Co., Durham, N. C.	April 13	1.30
1269	----do -----	Mayo Milling Co., Richmond, Va.	Smith & Terry, Hamlet, N. C.	Jan. 24	-----
1383	----do -----	Mountain City Mill Co., Chattanooga, Tenn.	W. T. Buchanan, Sanford, N. C.	Aug. 10 1906	-----
1232	----do -----	Mountain City Mill Co., Chattanooga, Tenn.	Townsend & Shower, Red Springs, N. C.	Jan. 22	-----
1231	----do -----	do -----	J. H. Pearson, Morganton, N. C.	Feb. 2 1906	-----
1230	----do -----	do -----	T. D. Engurd, Brevard, N. C.	Feb. 10	-----
1181	----do -----	New Market Roller Mills, New Market, Va.	E. H. Lawrence & Co., Durham, N. C.		-----
1312	----do (No. 2) -----	Pearl Roller Mills, Randleman, N. C.	Pearl Roller Mills, Randleman, N. C.	Mar. 26	-----
1316	----do -----	Piedmont Mills, Lynchburg, Va.	E. H. Lawrence & Co., Durham, N. C.	April 13 1906	-----
1257	----do -----	do -----	Davidson & Wolfe, Charlotte, N. C.	Feb. 17 1906	-----
1174	----do -----	do -----	Sockwell Bros., Greensboro, N. C.	Feb. 5 1906	-----
1338	----do -----	J. Allen Smith & Co., Knoxville, Tenn.	Blair & Co., North Wilkesboro, N. C.	April 19 1906	-----
1302	----do -----	Stuarts Draft Milling Co., Stuarts Draft, Va.	P. H. Mangum, Jr., Wake, N. C.	April 7	-----
1321	----do -----	Tennessee Mill Co., Estill Springs, N. C.	F. M. Carlton, Durham, N. C.	April 12	-----
1297	----do -----	Walkertown Milling Co., Walkertown, N. C.	Walkertown Milling Co., Walkertown, N. C.	Mar. 15	-----
1180	----do -----	White Star Mills, Staunton, Va.	Parker-Harris Co., Durham, N. C.	Feb. 7 1906	-----
1260	----do -----	do -----	Southern Grocery Co., Henderson, N. C.	Jan. 5 1906	-----
1285	----do -----	Wilson Grocery Co., Wilson, N. C.	Wilson Grocery Co., Wilson, N. C.	Jan. 13 1906	-----

DISCUSSION OF RESULTS.

Of the forty-two (42) samples of shipstuff examined, thirty-three (33) were pure-wheat products, eight (8) mixtures of corn and wheat products, and one (1)

ATION OF SHIPSTUFF.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Mois- ture.	Nitro- gen Free Extract.	
1291	-----	-----	-----	-----	-----	14.36	4.12	2.77	7.09	9.61	62.05	Wheat product.
1396	100	14.50	4.00	8.00	-----	15.37	4.70	6.85	4.42	9.83	58.83	do.
1395	100	14.50	4.00	8.00	-----	17.25	6.24	5.01	4.20	10.87	56.51	do.
1234	100	14.50	4.00	8.00	-----	14.87	5.02	7.95	3.59	6.39	62.16	do.
1198	-----	-----	-----	-----	-----	12.25	3.65	8.32	2.95	9.07	-----	Finely ground corn and wheat product.
1322	100	16.50	4.26	5.94	-----	-----	4.75	4.70	3.20	8.99	63.76	Wheat and corn product.
1259	100	16.50	4.26	5.94	-----	16.50	5.14	9.40	3.57	8.15	57.24	Wheat product.
1215	-----	-----	-----	-----	-----	16.12	5.60	4.31	3.48	10.65	59.84	do.
1341	80	15.12	4.45	4.25	-----	15.87	4.77	6.04	3.72	8.29	61.21	do.
1176	100	15.00	4.00	8.00	-----	16.10	5.07	6.85	4.61	7.54	59.83	do.
1185	-----	-----	-----	-----	-----	15.00	4.48	4.45	3.50	8.35	64.22	do.
1213	100	15.00	5.00	7.00	-----	13.94	3.28	6.71	4.10	9.19	62.78	Wheat bran and corn product.
1250	100	15.00	5.00	7.00	-----	15.50	4.80	9.95	2.22	6.13	61.40	Wheat bran and corn product.
1391	100	15.00	5.00	7.00	-----	14.25	3.07	6.64	3.72	11.33	60.99	Wheat product.
1223	100	18.00	5.37	4.72	-----	16.37	5.68	3.83	3.31	7.53	67.28	do.
1317	100	18.00	5.27	4.72	-----	15.37	4.56	3.60	2.75	9.28	64.44	do.
1269	100	15.62	3.95	6.00	-----	16.22	5.05	10.30	4.72	7.74	55.97	do.
1383	100	12.50	3.50	3.50	-----	14.37	2.29	8.69	5.33	11.34	57.98	Wheat and corn product.
1232	100	12.50	3.50	8.50	-----	16.00	4.37	9.90	3.03	3.01	63.69	do.
1231	100	12.50	3.50	8.50	-----	15.12	4.86	4.68	2.42	6.71	66.21	do.
1230	100	12.50	3.50	8.50	-----	14.87	5.04	5.59	1.57	6.37	66.56	do.
1181	-----	18.00	5.27	4.77	-----	16.37	5.29	4.13	3.20	7.78	63.23	Wheat product.
1312	-----	-----	-----	-----	-----	15.37	5.17	5.00	3.66	8.48	62.32	Corn and wheat product.
1316	100	15.00	4.00	6.00	-----	15.12	4.44	5.75	3.31	8.39	62.99	Wheat product.
1257	100	15.00	4.00	6.00	-----	14.75	3.60	10.15	4.72	8.57	58.21	do.
1174	100	15.00	4.00	6.00	-----	16.87	4.49	7.09	4.43	6.81	60.31	do.
1338	100	15.00	5.00	7.00	-----	14.87	5.60	6.24	4.16	8.02	61.11	do.
1302	-----	-----	-----	-----	-----	12.37	2.15	2.86	.79	9.40	72.43	do.
1321	100	16.00	4.00	5.00	-----	18.62	5.47	4.97	3.93	7.66	59.25	do.
1297	-----	-----	-----	-----	-----	16.25	3.97	5.60	3.46	9.89	60.83	do.
1180	-----	-----	-----	-----	-----	16.25	5.11	6.88	4.72	8.34	58.70	do.
1260	-----	14.50	4.00	8.00	-----	16.00	4.45	9.45	5.57	8.36	56.17	do.
1285	100	7.50	4.50	10.00	-----	9.37	4.48	15.02	11.08	6.95	53.10	Wheat, corn and rice prod- uct.

(No. 1285), a mixture of wheat, corn, and rice products.

Close inspection of the above table will reveal the merits of the different shipstuffs.

OAT FEEDS AND CORN AND OAT FEEDS.

In the manufacture of oat products for human food the kernel of the oat is separated from the hull. Oat hulls are in themselves low in food value, being very much like straw in this regard. Their value may be materially greater if broken kernels or small oats are ground in with them. Manufacturers of oat products are putting ground oat hulls on the market in many forms, such as Oat Feed, Oat Chops, Corn and Oat Feed, Purina Feed, Boss Corn and Oat Feed, Vim

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1349	Excelsior Corn and Oat Feed.	American Cereal Co., Chicago, Ill.	G. H. Shaver, Salisbury, N. C.	Apr. 12 1906	-----
1263	Victor Corn and Oat Feed.	-----do-----	Davidson & Wolfe, Charlotte, N. C.	Feb. 17 1906	-----
1329	-----do-----	-----do-----	G. L. Dull & Co., Winston, N. C.	Apr. 16 1906	-----
1264	-----do-----	-----do-----	R. L. Willis, Morehead City, N. C.	Jan. 17 1906	-----
1350	Boss Corn and Oat Feed.	Great Western Cereal Co., Chicago, Ill.	G. H. Shaver, Salisbury, N. C.	Apr. 21 1906	-----

DISCUSSION OF RESULTS.

Five (5) samples of corn and oat feeds were examined. These are low-grade

RICE FEEDS.

On preparing rice for human consumption the mills first remove the two outer layers and then polish the grain before it is ready for the market. Rice bran, rice polish and rice meal, which are known as rice feeds, are the by-products from the manufacture of rice for human consumption. Rice bran is the thin skin which lies next to the rice grain; rice polish is the by-product from polishing the rice grain after the bran has been removed; rice meal is a mixture of rice

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1216	Extra Rice Meal	Carolina Rice Mills, Goldsboro, N. C.	Carolina Rice Mills, Goldsboro, N. C.	Feb. 28 1906	-----
1233	Rice Meal	-----do-----	-----do-----	-----	-----

DISCUSSION OF RESULTS.

Two (2) samples of rice feeds were examined, and were found to be up to the usual standard.

Oat Feed, Victor Corn and Oat Feed, Model Corn and Oat Feed, Quaker Dairy Feed, and others. The bulk of all these materials is ground oat hulls with admixture of ground corn and oat kernels. The feeding value of them is variable and they should never be bought except on a guaranteed composition, and then it should be remembered that the oat hulls are not as digestible as the kernel of oats or other grains.

The price paid for these feeds is, as a rule, far in excess of their feeding value when compared with wheat bran, middlings and cotton-seed meal.

OAT FEEDS AND CORN AND OAT FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1349	100	9.00	4.00	-----	-----	7.87	5.56	11.98	4.41	6.07	64.11	Corn, oats and oat hulls.
1263	100	9.00	4.00	-----	-----	7.75	-----	11.90	3.61	8.05	-----	do.
1329	100	9.00	4.00	-----	-----	7.62	4.00	12.36	3.36	6.54	66.12	do.
1264	100	-----	-----	-----	-----	7.75	3.96	9.90	3.47	6.78	68.14	do.
1350	100	9.00	4.00	11.00	-----	7.75	3.30	11.45	4.23	10.17	63.10	do.

feeds, as they contain less than 8.00 per cent protein. The true character of these feeds is shown by the results in table above.

All this class of feeds bears a guaranteed analysis which should guide the consumer in purchasing.

bran and rice polish. Pure rice bran is seldom found in this State, as in the majority of cases it is mixed with rice hulls or chaff, and its feeding value is accordingly reduced. The polish is free from hulls and other substances and is about as good feed as corn meal, and can be fed profitably when purchased at the same price.

Rice feeds have a high fat content, and for this reason their keeping quality is rather poor.

NATION OF RICE FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1216	-----	-----	-----	-----	-----	11.37	10.16	8.53	5.47	7.78	56.69	Rice product.
1283	100	12.37	13.44	7.66	-----	9.75	6.89	9.59	11.68	6.03	56.06	do.

SACCHARINE (SUGAR) FEEDS.

These feeds are mixtures of molasses and feeds rich in protein, and should be productive of good results, provided the mechanical condition is satisfactory and the price is not excessive.

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1327	Saccharine Dairy Feed.	Lewis Leonhardt & Co., Knoxville, Tenn.	W. H. Dailey, Greensboro, N. C.	April 14 1906	-----
1246	-----do-----	-----do-----	King & Marshall, Hendersonville, N. C.	Feb. 12 1906	-----
1245	-----do-----	-----do-----	Asheville Grocery Co., Asheville, N. C.	Feb. 8 1906	-----
1310	Sucrene Dairy Feed.	American Milling Co., Chicago, Ill.	Mark H. Chesbro, West Raleigh, N. C.	April 26 1906	-----
1167	Mueller's Molasses Grains.	E. P. Mueller, Milwaukee, Wis.	Hutchison Bros., Reidsville, N. C.	Feb. 5 1906	-----
1358	-----do-----	-----do-----	Morrison Provision and Produce Co., Statesville, N. C.	April 24 1906	-----
1412	-----do-----	-----do-----	Peebles Bros., Raleigh, N. C.	Sept. 4 1906	-----

DISCUSSION OF RESULTS.

Seven (7) samples of molasses or sugar feeds were examined. They are average

CHOPS, HOMINY MEALS AND FEEDS.

The hard part of the corn kernel known as hominy, or hominy grits, is used for human food. The residue, or soft part of the kernel, sometimes called white

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1339	Corn chops-----	American Hominy Co., Decatur, Ill.	J. C. Henry, North Wilkesboro, N. C.	April 19 1906	-----
1191	Crushed corn-----	Berryville Milling Co., Berryville, Va.	Berryville Milling Co., Berryville, Va.	Feb. 13 1906	-----
1401	Corn chops-----	Boney & Harper Milling Co., Wilmington, N. C.	Caldwell & Carlyle, Lumberton, N. C.	Sept. 3 1906	-----
1379	Cracked corn-----	-----do-----	Boney & Harper Milling Co., Wilmington, N. C.	Sept. 4 1906	-----
1270	Corn chops-----	-----do-----	-----do-----	Jan. 20 1906	-----
1160	Corn meal-----	Bridgewater Milling Co., Fredericksburg, Va.	Bridgewater Milling Co., Fredericksburg, Va.	Jan. 19 1906	-----
1158	Corn chops-----	-----do-----	-----do-----	Nov. 15 1905	-----
1281	Meal and hominy--	Daisy Mills, Norfolk, Va.	J. H. Skittesnake & Co., Plymouth, N. C.	Jan. 11 1906	-----
1330	Corn chops-----	Forsyth Roller Mills, Winston-Salem, N. C.	Farmers Trade House, Winston, N. C.	April 16 1906	-----
1336	Chops-----	Granite City Mills, Mount Airy, N. C.	Granite City Mills, Mount Airy, N. C.	April 18 1906	-----
1334	-----do-----	-----do-----	F. F. Satterfield, Mount Airy, N. C.	April 18 1906	-----

Molasses is a carbohydrate and can be fed in small quantities to cattle satisfactorily, but when mixed with rich protein substances can be used in large quantities with good results.

TION OF SUGAR FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1327	100	17.00	4.00	-----	-----	11.07	5.15	15.47	8.25	7.46	52.58	Distillers' grains, oats, molasses, cotton-seed meal and some corn.
1246	100	17.00	4.00	-----	-----	13.12	4.06	11.88	9.14	7.79	54.01	do.
1245	100	17.00	4.00	-----	-----	19.62	6.40	7.68	3.18	6.13	59.99	do.
1310	-----	-----	-----	-----	-----	18.62	3.55	4.20	8.05	8.08	57.10	Corn, oats, barley, distillers' grains, wheat bran, cotton-seed meal, malt sprouts and molasses.
1167	100	19.81	2.73	-----	-----	11.25	3.94	14.24	5.87	7.72	56.98	Mostly barley and molasses.
1358	-----	-----	-----	-----	-----	16.62	3.66	9.02	5.64	10.16	54.94	do.
1412	-----	-----	-----	-----	-----	18.37	-----	9.29	6.10	13.81	-----	do.

good feeds and their chemical composition may be ascertained from data recorded in the above table.

meal, is sold as a cattle feed, and consists of the hull, germ and more or less of the protein and starch. It has a feeding value similar to dry corn meal.

CHOPS, HOMINY MEALS AND FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1339	100	-----	-----	-----	-----	10.75	9.30	8.49	2.84	5.50	63.12	Corn product.
1191	-----	-----	-----	-----	-----	9.50	4.27	13.09	-----	-----	-----	Crushed corn and cobs.
1401	100	10.00	7.25	7.00	-----	9.87	-----	1.99	2.55	8.29	-----	Corn product.
1379	-----	-----	-----	-----	-----	8.37	3.38	1.98	1.02	11.66	73.59	Cracked corn.
1270	100	12.00	11.00	10.00	-----	9.25	5.31	3.58	1.77	6.86	73.23	Corn product.
1160	-----	-----	-----	-----	-----	7.36	4.67	.88	-----	-----	-----	do.
1158	-----	-----	-----	-----	-----	8.62	6.73	7.68	-----	-----	-----	do.
1281	-----	-----	-----	-----	-----	9.00	4.09	1.78	1.30	8.82	75.01	Cracked corn.
1330	100	-----	-----	-----	-----	9.87	3.91	1.97	.37	7.48	76.40	Corn product.
1336	100	9.50	4.00	4.00	-----	10.87	2.49	14.06	1.19	7.30	64.09	Corn and wheat product.
1334	100	-----	-----	-----	-----	10.50	3.11	9.32	1.59	7.19	68.29	do.

RESULTS OF THE EXAMINATION OF CHOPS,

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1151	Chops-----	Granite City Mills, Mount Airy, N. C.	Granite City Mills, Mount Airy, N. C.		
1371	---do-----	J. M. Gwaltney & Co., Norfolk, Va.	J. M. Gwaltney & Co., Norfolk, Va.	May 31	
1309	Corn meal and wheat bran.	Grimes Bros., Lexington, N. C.	Grimes Bros., Lexington, N. C.	April 23	
1346	Hominy feed-----	Liberty Mills, Nashville, Tenn.	I. Lippmann, Salisbury, N. C.	April 21	
1293	Excelsior chops---	The Lewis Mills, Milton, N. C.	The Lewis Mills, Milton, N. C.	Mar. 15 1906	
1292	Yellow Dog and Excelsior chops.	---do-----	---do-----	Mar. 15 1906	
1253	Hominy feed-----	Liberty Mills, Nashville, Tenn.	J. S. Dixon, Littleton, N. C.	Jan. 6 1906	
1375	Cracked corn-----	John S. McEachern's Sons, Wilmington, N. C.	John S. McEachern's Sons, Wilmington, N. C.	Sept. 1 1906	
1306	Feed meal-----	Southern Cotton Oil Co., Savannah, Ga.	Southern Cotton Oil Co., Savannah, Ga.	April 17	
1308	Corn chops-----	Wachovia Mills, Winston-Salem, N. C.	Wachovia Mills, Winston-Salem, N. C.	April 21	

DISCUSSION OF RESULTS.

Twenty-one (21) samples of chops, hominy meals and feeds were examined. The name chops generally means a feed composed entirely of corn product, but this is not strictly adhered to by manufacturers, as some chops have been

COTTON-SEED FEEDS.

If cotton-seed meal contains less than 38.6 per cent protein it is below the standard required by the law on this subject and has had hulls or some other adulterant ground with it. Hulls are found with meal rather extensively and the mixture is no longer sold as genuine cotton-seed meal, but as cotton-seed

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1272	Cotton-seed feed---	Elba Mfg. Co., Charlotte, N. C.	Shell Bros. & Co., Hickory, N. C.	Feb. 2 1906	
1288	Cotton mixed feed-	Statesville Oil and Fertilizer Co., Statesville, N. C.	Cooper & Gill, Statesville, N. C.	Jan. 31 1906	
1342	Cotton - seed hull feed.	Southern Cotton Oil Co., Charlotte, N. C.	J. W. Harris & Co., High Point, N. C.	April 20 1906	
1217	Cotton - seed meal compound.	Universal Oil and Fertilizer Co., Wilmington, N. C.	Universal Oil and Fertilizer Co., Wilmington, N. C.	Mar. 6 1906	

DISCUSSION OF RESULTS.

Of the four (4) samples of cotton-seed feeds examined, three (3) were found

HOMINY MEALS AND FEEDS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1151						10.25	4.80	2.36				Corn product.
1371						9.75	4.30	16.39	5.11	15.69	48.76	Some corn, mostly oat hulls.
1309						12.25	4.65	4.32	3.47	7.75	67.56	Corn and wheat product.
1346	100	12.00	11.69	5.67		10.12	9.51	5.22	3.18	7.63	64.34	Corn product.
1293						9.75	5.10	6.82	2.23	8.46	67.04	Corn and oat product.
1292						15.00	4.40	4.94	2.77	8.99	63.90	Wheat product, with small amount of corn.
1253	100	11.69	12.00	5.67		12.22	8.62	4.38	2.96	7.01	64.81	Corn product.
1375						8.75	3.70	1.64	1.67	11.33	72.91	Cracked corn.
1306						24.25	6.87	19.56	3.84	6.75	38.73	Cotton-seed meal and hulls.
1308						9.12	4.67	1.20	1.40	7.27	76.34	Corn product.

collected containing corn mixed with other substances.

Corn chops should be examined for other substances before purchasing.

The above table should be carefully studied to get the true composition of these feeds.

Sample 1371 marked chops is mostly oat hulls with small amount of corn.

feed meal for cattle, etc. These feeds are valuable in proportion to the amount of meal in the mixture, which is measured by the protein in the analysis.

Cotton-seed feeds must have a guaranteed analysis consisting of the per cents of protein, fat and crude fiber on every bag or tag attached thereto, and not the per cent of nitrogen or ammonia.

OF COTTON-SEED MEAL FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Moisture.	Nitrogen Free Extract.	
1272	100	8.00	2.50	40.00		9.50	3.70	38.85	3.49	7.57	55.89	Cotton-seed hulls and meal.
1288	100	12.00	3.00	35.00		9.00	3.47	4.81	7.07	7.25	68.40	do.
1342	100	8.00	2.50	40.00		8.50	1.78	41.56	2.74	10.46	34.96	do.
1217						30.12	6.44	17.05	5.27	6.69	34.47	Cotton-seed meal and some hulls.

to be cotton-seed hulls and meal, and one (1) cotton-seed meal containing some cotton-seed hulls.

MISCELLANEOUS FEEDS.

Under this head is grouped mill feeds, mixed feeds, mill sweepings, screenings,

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1307	Mill feed -----	Aberdeen Power and Milling Co., Aberdeen, N. C.	Aberdeen Power and Milling Co., Aberdeen, N. C.	Apr. 17 -----	
1313	---do -----	do -----	do -----	Apr. 17 -----	
1139	Acme feed -----	Acme Milling Co., Talbot, Tenn.	Acme Milling Co., Talbot, Tenn.	Oct. 27 -----	
1221	Mixed feed -----	do -----	do -----	Feb. 6 -----	
1209	Mill feed -----	Archdale Roller Mills, Archdale, N. C.	E. R. Beckerdite, High Point, N. C.	Feb. 9 -----	
1343	---do -----	do -----	Kennedy Bros., High Point, N. C.	Apr. 20 -----	
1326	---do -----	do -----	Coe Bros., Greensboro, N. C.	Apr. 7 -----	
1192	---do -----	Ashboro Roller Mills, Ashboro, N. C.	Ashboro Roller Mills, Ashboro, N. C.	Feb. 9 -----	
1398	---do -----	do -----	do -----	Aug. 17 -----	
1390	---do -----	do -----	G. W. Allen, Troy, N. C.	Aug. 21 -----	
1389	---do -----	do -----	D. E. Pemberton, Troy, N. C.	Aug. 21 -----	
1298	Raw meat meal ---	-----	S. T. Beveridge & Co. (broker), Richmond, Va.	Apr. '6 -----	
1377	Feed -----	M. E. Bishop & Son, Thomasville, N. C.	M. E. Bishop & Son, Thomasville, N. C.	Aug. 2 -----	
1157	Mill feed -----	Bridgewater Milling Corporation, Fredericksburg, Va.	Bridgewater Milling Corporation, Fredericksburg, Va.	Jan. 15 -----	
1156	---do -----	do -----	do -----	Jan. 15 -----	
1154	---do -----	Bridgewater Milling Corporation, Fredericksburg, Va.	Bridgewater Milling Corporation, Fredericksburg, Va.	Jan. 15 -----	
1155	---do -----	do -----	do -----	Jan. 15 -----	
1337	Rye chop -----	Call Milling Co., North Wilkesboro, N. C.	Sent in by mill -----	April 9 -----	
1319	Barley -----	Louisville Malting Co., Louisville, Ky.	F. M. Carlton, Durham, N. C.	April 7 -----	
1145	Herculean feed ---	Carolina Feed Store, Raleigh, N. C.	Sent in by store -----	Dec. 5 -----	
1345	Feed -----	Cobb & Crews (brokers), Danville, Va.	J. L. Moses, High Point, N. C.	April 7 -----	
1200	Screenings -----	Concord Milling Co., Concord, N. C.	Sent in by mill -----	Feb. 20 -----	
1212	Mill feed -----	Crown Milling Co., Ashboro, N. C.	W. D. Smith, High Point, N. C.	Feb. 9 -----	
1190	---do -----	do -----	Sampled at mill -----	Feb. 9 -----	
1163	Mixed feed -----	Dixie Milling Co., High Point, N. C.	Sent in by mill -----	Jan. 19 -----	
1413	Pure feed -----	Douthat-Riddle Co., Danville, Va.	C. A. Norris & Co., Raleigh, N. C.	Sept. 4 -----	
1372	Feed -----	Hickory Milling Co., Hickory, N. C.	Sent in by M. P. Harrelson, Shelby, N. C.	Aug. 2 -----	
1314	Cow feed -----	J. Havens, Washington, N. C.	Sent in by mill -----	May 1 -----	
1261	Mill feed -----	Henderson Roller Mill Co., Monroe, N. C.	L. M. Presson, Monroe, N. C.	Jan. 25 -----	
1282	Dairy feed -----	The H.-O. Co., Buffalo, N. Y.	M. J. Brown, Edenton, N. C.	Jan. 10 -----	
1274	Mixed feed -----	Horne-Goans Mill Co., London, Tenn.	W. M. Graham, Charlotte, N. C.	Feb. 17 -----	
1219	Feed -----	The Lewis Mills, Milton, N. C.	Sent in by mill -----	Mar. 8 -----	

feed meals, etc. An idea of the quality of these feeds is given in the table below.

TABLE OF MISCELLANEOUS FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Mois- ture.	Nitro- gen Free Extract.	
1307	-----	-----	-----	-----	-----	10.37	4.48	6.47	2.70	10.01	65.97	Ground corn and oats.
1313	-----	-----	-----	-----	-----	11.00	4.02	6.30	2.87	11.33	64.48	Corn, oats and wheat prod- uct.
1139	-----	-----	-----	-----	-----	16.12	4.65	8.06	-----	-----	-----	Wheat product.
1221	100	11.00	3.50	4.00	-----	12.87	5.78	6.61	3.96	6.27	64.51	
1209	-----	13.00	2.50	4.00	-----	13.25	2.62	4.78	2.21	6.26	70.88	Wheat and corn product.
1343	80	13.00	2.50	4.00	-----	12.12	4.01	3.28	2.27	9.97	68.35	do.
1326	100	13.00	2.50	4.00	-----	12.25	3.61	3.78	3.02	7.11	69.43	
1192	-----	-----	-----	-----	-----	14.75	4.05	7.00	4.12	9.77	60.31	Wheat and corn product.
1398	100	15.00	4.25	7.00	-----	13.75	2.86	4.74	3.15	10.60	64.90	do.
1390	80	15.00	4.50	7.00	-----	15.10	5.48	5.95	2.17	11.64	59.66	do.
1389	80	15.00	4.25	7.00	-----	9.37	5.46	4.09	3.31	10.59	67.18	do.
1298	-----	-----	-----	-----	-----	85.06	7.47	0.27	2.47	-----	-----	Meat meal.
1377	-----	-----	-----	-----	-----	12.50	4.75	4.00	4.34	7.84	66.57	Wheat and corn product.
1157	-----	-----	-----	-----	-----	13.89	4.63	9.69	-----	-----	-----	do.
1156	-----	-----	-----	-----	-----	12.12	5.00	9.85	-----	-----	-----	do.
1154	-----	-----	-----	-----	-----	14.12	5.16	5.46	-----	-----	-----	Wheat product.
1155	-----	-----	-----	-----	-----	15.00	4.66	6.24	-----	-----	-----	do.
1337	100	-----	-----	-----	-----	12.75	1.41	2.89	1.81	8.40	72.74	Rye product.
1319	80	-----	-----	-----	-----	11.87	2.56	4.94	2.25	7.08	71.30	Barley.
1145	-----	-----	-----	-----	-----	16.25	6.38	6.57	-----	-----	-----	Wheat product, cotton-seed meal, corn, oats, mo- lasses, salt and condi- mental feed.
1345	-----	-----	-----	-----	-----	10.50	3.62	10.50	3.58	7.40	64.40	
1200	-----	-----	-----	-----	-----	13.50	2.43	3.10	3.17	8.80	69.00	Wheat shorts and screen- ings.
1212	-----	-----	-----	-----	-----	11.62	4.60	5.25	2.35	-----	-----	Wheat and corn product.
1190	-----	-----	-----	-----	-----	12.12	4.12	13.05	-----	-----	-----	Wheat bran and ground corn.
1163	-----	-----	-----	-----	-----	13.37	3.55	-----	-----	-----	-----	do.
1413	-----	12.50	3.75	8.50	-----	8.37	-----	10.06	5.58	11.76	-----	Wheat and corn product.
1372	-----	-----	-----	-----	-----	6.25	4.45	5.79	4.13	13.92	65.46	
1314	-----	-----	-----	-----	-----	19.75	9.00	5.72	3.92	9.80	51.81	Wheat bran, corn product and ground beans.
1261	100	17.65	7.60	6.50	-----	16.62	5.01	1.28	2.91	8.34	65.84	Wheat product.
1282	100	18.00	4.50	-----	-----	18.77	4.86	12.07	3.59	5.89	54.82	Ground oats, some ground corn, ground peas and gluten feed.
1274	80	13.25	4.69	7.42	-----	12.50	4.80	7.80	3.74	7.96	63.20	Wheat, bran and corn bran.
1219	-----	-----	-----	-----	-----	4.17	-----	-----	-----	-----	-----	Wheat product.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.	Retail Price of Package.
1344	Mixed feed -----	Magnolia Electric Mills, High Point, N. C.	J. L. Moses, High Point, N. C.	Apr. 20 1906	-----
1211	Mill feed -----	do -----	J. A. Davis, High Point, N. C.	Feb. 9 1906	-----
1280	Mixed feed -----	J. A. Meadows, New Bern, N. C.	Sampled at mill -----	Jan. 18 1906	-----
1362	Feed -----	The J. E. M. Milling Co., Lexington, Ky.	Sent in by mill -----	May 14 1906	-----
1150	Mill feed -----	Monitor Milling Co., Claremont, N. C.	do -----	Jan. 3 1906	-----
1348	Screenings -----	Pearl Roller Mills, Randleman, N. C.	Max Moses, Salisbury, N. C.	Apr. 2 1906	-----
1311	Mixed feed -----	do -----	From mill -----	Apr. 26 1906	-----
1239	do -----	Plott & Osborne Co., Canton, N. C.	J. L. Smathers & Co., Murphy, N. C.	Jan. 18 1906	-----
1411	Feed -----	Raleigh Milling Co., Raleigh, N. C.	Peebles Bros., Raleigh, N. C.	Sept. 4 1906	-----
1393	Mill feed -----	Riverside Milling and Power Co., Cartersville, Ga.	K. W. Ashcraft, Wadesboro, N. C.	Aug. 29 1906	-----
1394	do -----	do -----	Gray Grocery Co., Wadesboro, N. C.	Aug. 4 1906	-----
1408	do -----	do -----	J. P. Wyatt & Bro., Raleigh, N. C.	Sept. 4 1906	-----
1415	do -----	do -----	Phillips & Penny, Raleigh, N. C.	Sept. 4 1906	-----
1380	Mill feed -----	Herman De Runeau, Crimora, Va.	W. T. Tyson, Sanford, N. C.	Aug. 10 1906	-----
1299	Feed -----	Shelby Roller Mills, Shelby, N. C.	Sent in by mill -----	April 6 1906	-----
1162	Middlings -----	Star and Crescent Milling Co., Chicago, Ill.	W. B. Cooper, Wilmington, N. C.	Jan. 19 1906	-----
1305	Chufas -----	do -----	Stonewall Adams, Raleigh, N. C.	Mar. 7 1906	-----
1207	Mill feed -----	Thomasville Roller Mills, Thomasville, N. C.	Perdue & Co., High Point, N. C.	Feb. 9 1906	-----
1301	Feed -----	G. A. Thompson, Thomasville, N. C.	Sent in by mill -----	April 7 1906	-----
1410	do -----	J. H. Walker & Co., Reidsville, N. C.	Hunter & Dunn, Raleigh, N. C.	Sept. 9 1906	-----
1364	do -----	Walkertown Milling Co., Walkertown, N. C.	Sent in by mill -----	May 31 1906	-----
1361	Mill feed -----	Xmore Mills, Charlotte, N. C.	do -----	May 12 1906	-----
1159	Beet pulp -----	do -----	Carolina Feed Store, Raleigh, N. C.	Nov. 16 1906	-----
1376	Protena alfalfa feed.	Ralston Purina Co., St. Louis, Mo.	Ralston Purina Co., St. Louis, Mo.	Sept. 1 1906	-----

DISCUSSION OF RESULTS.

Fifty-six (56) samples of miscellaneous feeds were examined.

OF MISCELLANEOUS FEEDS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.						Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	Mois- ture.	Nitro- gen Free Extract.	
1344	-----	-----	-----	-----	-----	9.87	4.55	2.94	2.20	8.70	71.74	Wheat and corn product.
1211	80	10.00	6.50	7.00	-----	-----	4.19	5.72	2.34	-----	-----	Corn, oats and wheat product.
1280	100	12.00	1.50	4.50	-----	9.37	4.94	2.80	1.45	8.04	73.40	Wheat, corn and some oats.
1362	-----	-----	-----	-----	-----	15.00	5.95	7.82	4.58	9.50	57.15	Wheat, bran and corn product.
1150	-----	-----	-----	-----	-----	12.25	4.00	9.54	13.48	-----	-----	Wheat and corn bran.
1348	100	-----	-----	-----	-----	13.37	2.52	4.68	3.06	7.73	55.64	Screenings.
1311	-----	-----	-----	-----	-----	13.25	3.45	7.86	3.06	9.26	63.12	Wheat, bran and corn product.
1239	80	12.00	4.46	9.36	-----	12.50	4.92	4.78	4.33	5.51	68.21	Wheat and corn product.
1411	-----	-----	-----	-----	-----	12.50	4.84	5.29	2.40	10.95	64.02	Mostly wheat bran and corn bran.
1393	100	12.38	4.32	-----	-----	12.56	5.22	2.96	3.13	9.79	64.34	Wheat and corn product.
1394	100	12.38	4.32	-----	-----	12.56	5.28	3.73	3.14	11.53	63.76	do.
1408	100	14.00	6.00	7.00	-----	12.52	5.46	5.92	3.53	11.73	60.84	do.
1415	-----	14.00	6.00	7.00	-----	12.00	4.14	5.65	3.12	11.13	63.96	do.
1380	100	14.00	4.00	8.00	-----	14.35	2.96	6.04	3.12	12.24	61.29	
1299	-----	-----	-----	-----	-----	17.00	4.95	6.07	4.32	8.29	56.37	Wheat product.
1162	-----	-----	-----	-----	-----	15.93	5.52	7.64	-----	-----	-----	do.
1305	-----	-----	-----	-----	-----	5.00	30.40	6.58	2.03	7.38	48.61	Chufas.
1207	-----	18.75	4.66	4.75	-----	15.00	5.07	5.96	4.29	6.67	63.01	Wheat product.
1301	-----	-----	-----	-----	-----	10.37	4.35	3.33	2.71	8.87	70.37	Wheat and corn product.
1410	100	12.87	4.11	7.57	-----	11.75	-----	7.79	2.81	11.78	-----	do.
1364	-----	-----	-----	-----	-----	11.75	3.19	2.37	2.31	7.83	59.37	
1361	-----	-----	-----	-----	-----	9.87	9.26	5.45	1.91	7.47	66.04	Ground oats and corn product.
1159	-----	-----	-----	-----	-----	9.20	.75	20.20	-----	-----	-----	Beet pulp.
1376	-----	-----	-----	-----	-----	11.25	4.31	16.56	5.41	9.96	52.51	Corn, oats and alfalfa.

A critical examination of the above table will reveal the true quality of these feeds.

ADULTERANTS.

When mixed with other good feeding materials without proper labeling or guarantee to indicate their presence, corn bran, rice chaff, ground corn-cobs, peanut hulls, peanut middlings, oat hulls, oat dust, mill sweepings, screenings, cotton-seed hulls, and other similar products are adulterants. The tables containing the chemical and microscopic examinations show that these adulterants were used to a considerable extent in the make-up of the feeds sold for stock in the State prior to the enforcement of the present Feed Law. To convey an idea of the real feeding value of these adulterants the following analyses were made:

	Per Cent Protein.	Per Cent Fat.	Per Cent Ash.	Per Cent Fiber.
Peanut hulls -----	4.56	.81	2.17	67.31
Peanut middlings -----	8.75	.88	16.75	40.75
Ground corn-cobs -----	3.12	.32	2.19	30.37
Rice chaff -----	2.50	.31	18.37	34.40
Oat hulls -----	3.03	1.06	6.70	29.07
Oat dust -----	8.09	5.01	6.09	1.82
Wheat screenings -----	9.08	2.02	2.90	3.00
Corn bran -----	9.00	5.08	1.30	12.70
Cotton-seed hulls -----	4.75	1.59	3.20	40.54

Inspection and Analyses of Cotton-seed Meal.

AN ACT TO REGULATE THE SALE AND INSPECTION OF COTTON-SEED MEAL.

[Chapter 267, Laws 1905.]

The General Assembly of North Carolina do enact:

SECTION 1. That chapter three hundred and thirty-nine (339) of the Public Laws of one thousand nine hundred and three (1903), entitled "An act to regulate the sale, inspection and branding of cotton-seed meal," be amended so as to read as follows:

SEC. 2. That all cotton-seed meal sold for use as fertilizer or feed shall be subject to an inspection tax of twenty cents per ton, and be subject to inspection, as other fertilizers or fertilizing materials, unless sold to manufacturers for use in manufacturing fertilizers.

SEC. 3. That all cotton-seed meal offered for sale, unless sold to manufacturers for use in manufacturing fertilizers, shall have plainly branded on the bag containing it, or on a tag attached thereto, the following data:

1. Cotton-seed meal with brand.
2. Weight of package.
3. Ammonia or nitrogen.
4. Name and address of manufacturer.

SEC. 4. That no person or persons, firm or corporation shall offer for sale any cotton-seed meal, except as provided in section three of this act, with a minimum per cent of ammonia of less than seven and one-half ($7\frac{1}{2}$) per cent. Meal containing seven and one-half ($7\frac{1}{2}$) per cent or more of ammonia is standard meal, and may be so branded. Meal containing eight (8) per cent or more of ammonia is high-grade meal, and may be so branded.

SEC. 5. That the State Board of Agriculture is empowered and directed to make such rules and regulations as are necessary to a proper carrying into effect the provisions of this act, and to provide for all such tags as manufacturers may demand, upon paying the tax therefor. Any person wilfully violating any of the regulations made by the Board of Agriculture in connection with this act shall be guilty of a misdemeanor. Any person or persons, firm or corporation who shall sell or offer for sale any cotton-seed meal without having the proper tax tags attached thereto, or who shall use the required tags the second time to avoid the payment of the tonnage charge, and every person who shall remove any such meal, shall be liable to a penalty of ten dollars (\$10) for each separate bag, barrel or other package sold or offered for sale or removed, to be recovered by any person who may sue for the same.

SEC. 6. That any person or persons, firm or corporation who shall sell or offer for sale any cotton-seed meal contrary to the provisions above set forth shall be guilty of a misdemeanor, and all cotton-seed meal so sold or offered for sale shall be subject to seizure, condemnation and sale by the Commissioner of Agriculture. Such seizure and sale shall be made under the direction of the Commissioner of Agriculture by an officer or agent of the department; the sale to be made at the court-house door in the county in which the seizure is made, after thirty (30) days' advertisement in some newspaper published in said county, or if no newspaper is published in said county, then by like advertisement in a newspaper published in the nearest county thereto having a newspaper. The advertisement shall state the grade of the meal, the quantity, why seized and offered for sale.

The Commissioner, however, shall have the discretion to release the meal so seized and condemned upon compliance with the law as set forth above and the payment of all costs and expenses incurred by the department in any proceedings connected therewith. The net proceeds from such sale shall be placed in the general fund of the department and accounted for upon its books.

SEC. 7. Whenever the Commissioner of Agriculture shall be satisfied that any cotton-seed meal is essentially below the guaranteed analysis it shall be his duty to assess said deficiency against the manufacturer of the meal and require that

the value of said deficiency be made good to all persons who, in the opinion of the Commissioner, have purchased the said meal; and the Commissioner may seize any meal belonging to said company, to the value of the deficiency, if the deficiency shall not be paid within thirty (30) days after notice to the company. If the Commissioner shall be satisfied that the deficiency in analysis was due to intention or fraud of the manufacturer, then the Commissioner shall assess and collect from the manufacturer twice the amount of the deficiency and pay over the same to parties who purchased said meal. That if any manufacturer shall resist such collection or payment the Commissioner shall immediately publish the analysis and the facts in THE BULLETIN and in such newspapers in the State as he may deem necessary.

SEC. 8. It shall be unlawful for any manufacturer to adulterate cotton-seed meal in the process of manufacture or otherwise.

SEC. 9. This act shall be in force from and after July first, nineteen hundred and five (1905).

In the General Assembly read three times, and ratified this the 17th day of February, A. D. 1905.

ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per cent Ammonia Guaranteed.	Per cent Ammonia Found.	Per cent Protein Found.	Remarks.
2003	Battleboro Oil Co., Battleboro, N. C.-----	Battleboro-----		8.36	43.05	
986	----do-----	----do-----		8.16	42.01	
2038	----do-----	----do-----		8.05	41.45	
973	----do-----	----do-----		8.02	41.30	
988	----do-----	----do-----		7.68	39.55	
2002	----do-----	----do-----		7.50	38.62	
995	----do-----	----do-----		7.46	38.41	
2080	----do-----	----do-----		8.03	41.35	
2081	----do-----	----do-----		7.66	39.44	
2032	Bragaw, William, & Co., Washington, N. C.-----	Washington---	7.50	7.54	38.83	
968	Chatham Cotton Oil Co., Pittsboro, N. C.---	Pittsboro-----		8.02	41.30	
957	Clayton Oil Co., Clayton, N. C.-----	Clayton-----		7.60	39.14	
2011	----do-----	----do-----		7.50	38.62	
2044	Consumers Cotton Oil Co., Tarboro, N. C.---	Tarboro-----	7.50	7.38	38.00	
981	Cotton Oil and Ginning Co., Scotland Neck, N. C.-----	Scotland Neck-----		7.72	39.75	
2056	----do-----	Palmyra-----		7.68	39.55	
2031	Dunn Oil Mill Co., Dunn, N. C.-----	Roseboro-----	7.50	7.99	41.14	
2023	Elba Manufacturing Co., Charlotte, N. C.---	Charlotte-----		8.05	41.45	
959	----do-----	Hickory-----		7.32	37.69	
2043	Farmers Cotton Oil Co., Wilson, N. C.----	Enfield-----	7.50	8.09	41.66	
2058	----do-----	Elm City-----		8.05	41.45	
977	Fremont Oil Co., Fremont, N. C.-----	Fremont-----		7.94	40.89	
992	Havens Oil Co., Washington, N. C.-----	Washington---		7.60	39.14	
2009	----do-----	----do-----	7.50	8.11	41.76	
2045	----do-----	Franklinton---	7.50	7.50	38.62	
2006	Hertford Cotton Oil Co., Hertford, N. C.---	Elizabeth City-	7.50	7.58	39.03	
990	Laurinburg Oil Co., Laurinburg, N. C.-----	Laurinburg---		8.12	41.81	
983	Lenoir Oil and Ice Co., Kinston, N. C.-----	Kinston-----		8.72	44.90	
975	----do-----	----do-----		8.58	43.18	
954	----do-----	----do-----		8.36	43.05	
955	----do-----	----do-----		8.32	42.84	
970	----do-----	----do-----		8.30	42.74	
993	----do-----	----do-----		8.28	42.64	
953	----do-----	----do-----		8.24	42.43	
998	----do-----	----do-----		8.08	41.61	

ANALYSES OF COTTON-SEED MEAL.—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per cent Ammonia Guaranteed.	Per cent Ammonia Found.	Per cent Protein Found.	Remarks.
2040	Lenoir Ice and Oil Co., Kinston, N. C.	Kinston		8.13	41.86	
985	Louisburg Cotton Oil Mill, Louisburg, N. C.	Wake Forest		8.21	42.38	
965	North Carolina Cotton Oil Co., Charlotte, N. C.	Charlotte		7.44	38.31	
2053	do	Lumber Bridge		7.97	41.04	
956	North Carolina Cotton Oil Co., Henderson, N. C.	Henderson		7.96	40.99	
2029	do	Scotland Neck		7.83	40.32	
966	North Carolina Cotton Oil Co., Raleigh, N. C.	Raleigh		8.20	42.23	
2037	do	Wake Forest	7.50	7.56	38.93	
2055	do	Raeford		7.72	39.75	
2015	North Carolina Cotton Oil Co., Wilmington, N. C.	Whiteville	7.50	7.68	39.55	
2016	do	Warsaw	7.50	7.64	39.75	
987	Pine Level Oil Mill, Pine Level, N. C.	Pine Level		8.66	44.59	
2048	do	Smithfield	7.50	7.95	40.94	
967	Pitt County Oil Mill Co., Winterville, N. C.	Winterville		8.36	43.05	
2007	do	Greenville	7.50	8.11	41.76	
952	Planters Cotton-seed Oil Co., Rocky Mount, N. C.	Rocky Mount		7.94	40.89	
962	do	do		7.78	40.06	
2064	do	do		7.99	41.14	
997	Red Springs Oil and Fertilizer Co., Red Springs, N. C.	Red Springs		7.96	40.99	
976	Rowland Oil and Fertilizer Co., Rowland, N. C.	Rowland		7.74	39.81	
2027	Royster, F. S., Guano Co., Tarboro, N. C.	Everett	7.50	8.18	42.12	
2035	Southern Cotton Oil Co., Charlotte, N. C.	Gibson Station	7.50	7.89	40.63	
2008	Southern Cotton Oil Co., Conetoe, N. C.	Washington	7.50	7.63	39.55	
2047	do	Conetoe	7.50	7.66	39.44	
2034	Southern Cotton Oil Co., Goldsboro, N. C.	Magnolia	7.50	7.73	39.80	
2033	do	Goldsboro	7.50	7.73	39.80	
2026	do	Enfield	7.50	7.95	40.94	
2025	Southern Cotton Oil Co., Rocky Mount, N. C.	Rocky Mount	7.50	7.99	41.14	
2046	do	do	7.50	7.54	38.89	
2049	Southern Cotton Oil Co., Selma, N. C.	Smithfield	7.50	7.48	38.59	
958	Southern Cotton Oil Co., Wilmington, N. C.	Mount Olive		7.66	39.44	
2010	Southern Cotton Oil Co., Wilson, N. C.	Edenton	7.50	7.02	36.15	
2028	do	Tillery	7.50	7.26	37.38	
2030	Southern Cotton Oil Co., Charlotte, N. C.	Black Creek	7.50	7.72	39.75	
969	Spring Hope Cotton Oil Co., Spring Hope, N. C.	Spring Hope		7.86	40.47	
974	Verner Oil Co., Lattimore, N. C.	Lattimore		8.30	42.74	

ANALYSES OF COTTON-SEED MEAL.—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per cent Ammonia Guaranteed.	Per cent Ammonia Found.	Per cent Protein Found.	Remarks.
2005	Virginia-Carolina Chemical Co., Richmond, Va.	Edenton-----	7.50	8.25	42.48	
2022	Wrendale Oil Mill Co., Battleboro, N. C.	Battleboro-----		8.40	43.26	
982	---do-----	---do-----		7.94	40.89	
999	---do-----	---do-----		7.48	38.53	

DISCUSSION OF RESULTS.

Good grades of cotton-seed meal contain 43 per cent or more of protein. This means that they have about 7 per cent of nitrogen, which is equal to 8.50 per cent of ammonia. Meals in past years especially have not infrequently been considerably higher than this.

Seventy-five (75) samples of cotton-seed meal were examined.

Sixty-six (66) of these contained as much or more protein than was required by the standard of 7.50 per cent ammonia, which equals 38.62 per cent protein.

Eight (8) samples were below the legal standard, as they did not contain as much as 7.50 per cent ammonia.

THE MICROSCOPIC EXAMINATION OF FEEDS.

It was not possible to make chemical analyses of all samples collected, but microscopic examinations were made of all samples. The results of the microscopic examination of samples are brought together below:

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Ingredients.
1 (M)	Shipstuff-----	Adams Grain and Provision Co., Richmond, Va.	S. J. Stalling, Littleton, N. C.	Wheat product.
2 (M)	---do-----	Adams Grain and Provision Co., Charlotte, N. C.	William Lemly & Co., Morrisville, N. C.	Wheat product and some weed seeds.
44 (M)	Bran and shorts---	Acme Milling Co., Talbot, Tenn.	Bristol & Harbison, Morganton, N. C.	Wheat and corn product.
51 (M)	Victor corn and oat feed.	American Cereal Co., Chicago, Ill.	Parham Bros., Morganton, N. C.	Corn, oats and oat hulls.
28 (M)	Bran-----	Asheville Milling Co., Asheville, N. C.	John F. Love, Gastonia, N. C.	Wheat bran and corn bran.
29 (M)	---do-----	---do-----	John E. Fain, Murphy, N. C.	do.
30 (M)	---do-----	---do-----	Forney & Co., Morganton, N. C.	do.
21 (M)	Shipstuff-----	Ballard & Ballard, Louisville, Ky.	George A. Rose & Co., Henderson, N. C.	Wheat product.
25 (M)	---do-----	---do-----	Boykin Co., Wilson, N. C.	do.
41 (M)	---do-----	---do-----	Bost & Newton, Hickory, N. C.	do.
49 (M)	Coarse flakey bran-	Crescent Milling Co., Minneapolis, Minn.	Southern Grocery Co., Henderson, N. C.	do.
23 (M)	Shipstuff-----	Dan Valley Mills, Danville, Va.	Wells Grocery Co., Wilson, N. C.	do.
31 (M)	---do-----	---do-----	Cooper & Gill, Statesville, N. C.	do.
32 (M)	---do-----	---do-----	Best & Thompson, Goldsboro, N. C.	do.
18 (M)	---do-----	Dunlop Mills, Richmond, Va.	The Alston Co., Louisville, N. C.	do.
19 (M)	Wheat bran-----	---do-----	E. A. Keely & Co., Henderson, N. C.	Wheat bran and some corn bran.
22 (M)	Shipstuff-----	---do-----	The Gray Co., Littleton, N. C.	
26 (M)	---do-----	---do-----	W. B. Dawes, Selma, N. C.	Wheat product.

MICROSCOPIC EXAMINATION OF FEEDS.—CONTINUED.

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Ingredients.
27 (M)	Middlings -----	Dunlop Mills, Richmond, Va.	W. A. Williams, Morehead City, N. C.	Wheat product.
42 (M)	Shipstuff -----	Harrisonburg Milling Co. Harrisonburg, Va.	J. Flem. Johnson & Co., Gastonia, N. C.	do.
39 (M)	Bran and shorts ---	Mecklenburg Roller Mills, Charlotte, N. C.	Lula Store Co., Kings Mountain, N. C.	do.
17 (M)	Shipstuff -----	J. D. Manor & Co., New Market, Va.	Sterling Cotton Mill, Franklinton, N. C.	do.
9 (M)	---do -----	Mountain City Mill Co., Chattanooga, Tenn.	S. K. Breeding, Hendersonville, N. C.	Wheat and corn product.
10 (M)	Mixed bran -----	do -----	R. H. Hyatt & Co., Murphy, N. C.	do.
11 (M)	---do -----	do -----	T. D. England, Brevard, N. C.	do.
12 (M)	Shipstuff -----	do -----	Cochran & McLaughlin, Charlotte, N. C.	do.
13 (M)	Mixed bran -----	do -----	do -----	do.
33 (M)	---do -----	do -----	Stradley & Luther, Asheville, N. C.	Wheat bran and corn bran.
34 (M)	---do -----	do -----	John H. Pearson, Morganton, N. C.	do.
6 (M)	Wheat shorts -----	Liberty Mills, Nashville, Tenn.	Hyatt & Rhinehardt, Waynesville, N. C.	Wheat product.
7 (M)	Wheat bran -----	do -----	Johnson Bros., Charlotte, N. C.	do.
8 (M)	Wheat shorts -----	do -----	Boger, Rosenbrough & Co., Morganton, N. C.	do.
50 (M)	Go Far Bran -----	New Prague Flour Mill Co., New Prague, Minn.	Burrus & Coleman, Henderson, N. C.	do.
38 (M)	Bran and shorts ---	Newport Mill Co., Newport, Tenn.	J. A. Greer, Asheville, N. C.	Wheat bran and corn product.
14 (M)	Wheat bran -----	Read Bros., Morristown, Tenn.	Forney & Co., Morganton, N. C.	Wheat bran.
15 (M)	---do -----	do -----	C. Sawyer, Biltmore, N. C.	do.
16 (M)	---do -----	do -----	John E. Fain, Murphy, N. C.	do.
43 (M)	Middlings -----	The Riverton Mills Co., Riverton, Va.	A. F. Hartsell Co., Concord, N. C.	do.
53 (M)	Mixed feed -----	Riverside Milling and Power Co., Cartersville, Ga.	Phillips & Penny, Raleigh, N. C.	Corn and wheat product.
3 (M)	Wheat bran -----	J. Allen Smith & Co., Knoxville, Tenn.	Neuse Milling Co., Kinston, N. C.	Wheat product.
4 (M)	Shipstuff -----	do -----	John E. Fain, Murphy, N. C.	do.
5 (M)	---do -----	do -----	Concord Wholesale Grocery Co., Concord, N. C.	do.
40 (M)	---do -----	Statesville Flour Mills, Statesville, N. C.	W. W. Rankin & Co., Mooresville, N. C.	do.
35 (M)	Wheat middlings--	Tennessee Mill Co., Estill Springs, Tenn.	J. A. Greer, Asheville, N. C.	do.
36 (M)	---do -----	do -----	Lackey Bros., Hamlet, N. C.	do.
37 (M)	---do -----	do -----	Rankin, Harris & McNeely, Mooresville, N. C.	do.
24 (M)	Wheat bran -----	Washburn-Crosby Co., Minneapolis, Minn.	Wells Grocery Co., Wilson, N. C.	Wheat bran.
45 (M)	---do -----	Washburn-Crosby Co., Louisville, Ky.	T. Ivey, Cary, N. C.	Pure wheat bran.
46 (M)	---do -----	do -----	do -----	Wheat shorts.
48 (M)	Wheat middlings--	White Star Mills, Staunton, Va.	Keely & Co., Henderson, N. C.	Wheat product.
20 (M)	Middlings -----	do -----	Southern Grocery Co., Henderson, N. C.	do.

DISCUSSION OF RESULTS.

Fifty-one (51) samples of feeds were examined microscopically. Inspection of the above table will reveal the components of these feeds.

SUMMARY.

Wheat Bran.—Of the fifty-six (56) samples of bran examined, forty-four (44) were found to be pure-wheat products, while the other twelve were mostly mixtures of wheat bran and corn bran.

Middlings.—Fifty-one (51) samples of middlings or shorts were examined, and all were found to be pure-wheat products.

Bran and Shorts.—Of the twenty-two (22) samples of bran and shorts examined, eleven were pure-wheat products. The remaining ones were mixtures of wheat products and other materials.

Shipstuff.—Of the forty-two (42) samples of shipstuff examined, thirty-three (33) were found to be pure-wheat products, while the others proved to be mixtures of wheat products with other substances.

Corn and Oat Feeds.—Five (5) samples of corn and oat feeds were examined, and were found to be about an average in quality for this class of feeds.

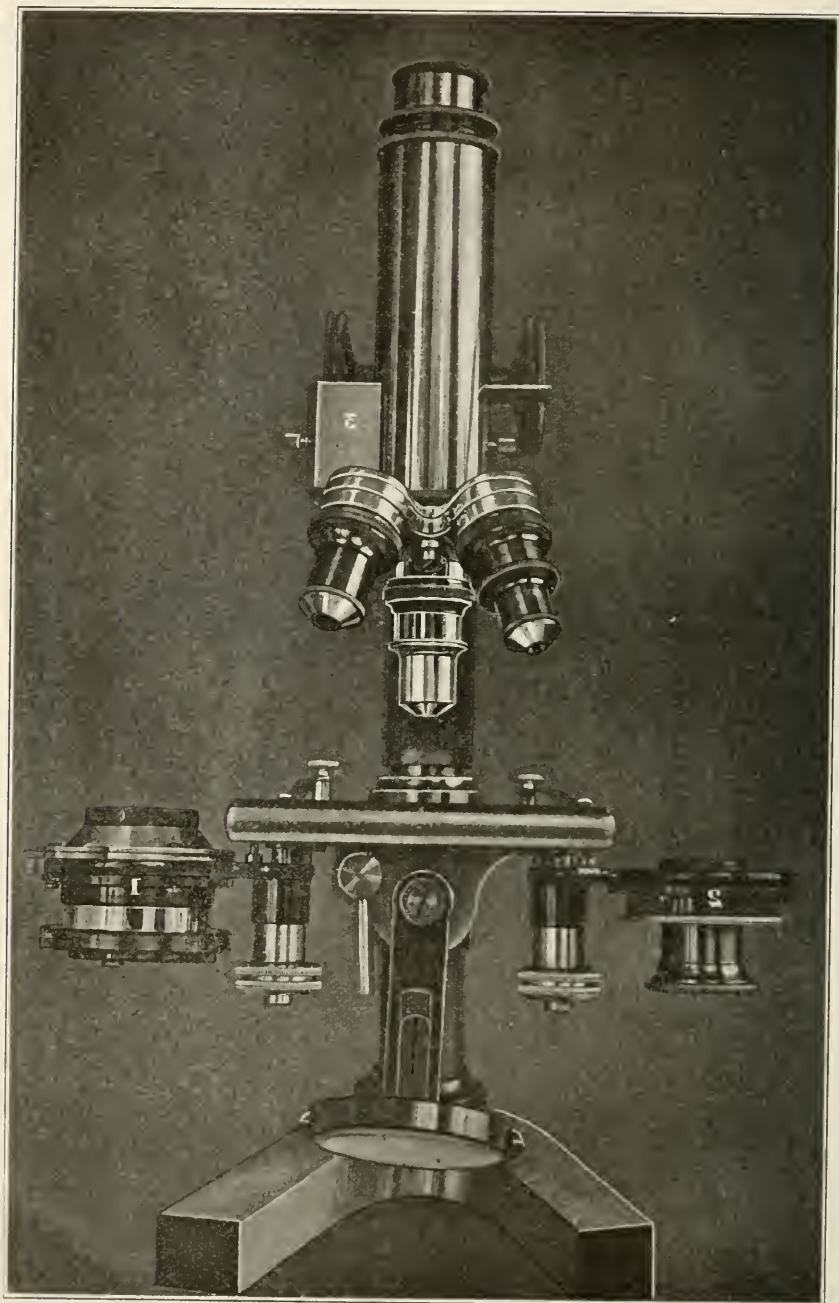
Rice Feeds.—Two (2) samples of rice feeds were examined, which were up to standard quality.

Molasses Feeds.—Seven (7) samples of molasses feeds were examined. These are average quality feeds, being perhaps a little better than wheat bran.

Hominy Feeds.—Twenty-one (21) samples were examined, and were found to be about standard in quality.

Cotton-seed Feeds.—Four samples were examined, and all but one were up to guarantee.

Miscellaneous Feeds.—Fifty-six (56) samples were examined, and most of them were of good quality.



A MICROSCOPE FOR THE RAPID CHANGING FROM PLANE TO POLARIZED LIGHT AND VICE VERSA.

BY C. H. GAGE.

*“The micro-polariscope or polarizer is a polariscope used in connection with the microscope. The most common and typical forms consist of two prisms, that is, two somewhat elongated rhombs of Iceland spar and cemented together with Canada balsam.

“These nicol prisms are then mounted in such a way that the light passes through them lengthwise, and in passing is divided into two rays of plane polarized light.

“*Polarizer and Analyzer.*—The polarizer is one of the nicol prisms. It is placed beneath the object, and in this way the object is illuminated with polarized light. The analyzer is the other nicol and is placed at some level above the object very convenient above the objective.”

The application of polarized light in the microscopic examination of foods and feeds is indispensable. Its importance, however, is not as yet fully recognized by many chemists.

The chemist many times in examining a product has to resort to the differences existing between the starch granules of different substances for his final conclusions. Many starches differ greatly in size, shape, hilum, action towards certain reagents and polarized light. There are exceptions to this, and in examining foods we sometimes find different starches resembling each other closely in size, shape, and action towards certain reagents. When such a case presents itself we generally get a clearer insight into the product by using polarized light.

It is very seldom we find different starches in the same mixture that polarize alike. So polarized light is what we resort to in the end.

The ordinary continental microscopes do not have the micro-polariscope readily adjustable. When using polarized light with these instruments considerable time is lost in changing from plane to polarized light.

The microscope shown in this ent was designed by the writer to save as much time as possible in changing from plane to polarized light, and *vice versa*.

The instrument is constructed with two substages instead of one, the regular one (1) for the abbé condenser and the other (2) for the polarizer. The polarizer so arranged can be thrown into the optical axis at will. The analyzer (3) or other nicol prism is mounted as in petro-graphical instruments, the prism being placed in the draw-tube

* Gage.

just above the objective. It is constructed that when polarized light is desired the analyzer is swung to the right, at the same time the abbé condenser is moved to the right and the polarizer swung into its place from the left. When plane light is desired the analyzer and abbé condenser are moved back to their original positions, the abbé condenser taking the place previously occupied by the polarizer. These changes can be made in a very few seconds, thus saving considerable time that cannot be saved with the ordinary microscopes, which are not similarly constructed.

The present impracticable way of changing from plane to polarized light with ordinary microscopes and the time consumed in the operation is well known to all microscopists. It is not necessary to have an instrument as shown in this cut made to order. It is a simple matter and not expensive for manufacturers of microscopes to fit any microscope with an analyzer in the draw-tube and a second substage for the polarizer so that both can be brought into and thrown out of use as described above.

This instrument has been in use in this laboratory for about six months and has given satisfaction.

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

SEVENTH REPORT

ON

FOOD ADULTERATION

UNDER THE PURE FOOD LAW.

DECEMBER, 1906

THIS BULLETIN IS SENT FREE TO RESIDENTS OF THE STATE ON APPLICATION

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THE BULLETIN.

VOLUME 27.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 12.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, DECEMBER, 1906.

REPORT ON FOOD PRODUCTS FOR 1906.

BY

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The results of the examination of food products for the year 1906, which is the Seventh Annual Report, the food law under which the work has been done, and the rulings and food standards adopted by the Board of Agriculture are presented on the following pages.

AN ACT TO PREVENT THE SALE OF ADULTERATED AND MISBRANDED FOOD.

Chapter 86, Public Laws 1899.

Chapter 306, Public Laws 1905.

The General Assembly of North Carolina do enact:

SECTION 1. That for the purpose of protecting the people of the State from imposition by the adulteration and misbranding of articles of food the Board of Agriculture shall cause to be procured from time to time, and under rules and regulations to be prescribed by them in accordance with section 9 of this act, samples of food, beverages and condiments offered for sale in the State, and shall cause the same to be analyzed or examined microscopically or otherwise by the chemists or other experts of the Department of Agriculture. The Board of Agriculture is hereby authorized to make such publications of the results of the examinations, analyses and so forth as they may deem proper.

SEC. 2. That no person, by himself or agent, shall knowingly manufacture, sell, expose for sale, or have in his possession with intent to sell, any article of food which is adulterated or misbranded within the meaning of this act: and any person who shall violate any of the provisions of this act shall be guilty of a misdemeanor, and for such offense shall be fined not exceeding two hundred dollars for the first offense and for each subsequent offense not exceeding three hundred dollars, or be imprisoned not exceeding one year, or both, in the discretion of the court; and such fines, less legal costs and charges, shall be paid into

the treasury of the State, for the benefit of the Department of Agriculture, to be used exclusively in executing the provisions of this act.

SEC. 3. That the chemists or other experts of the Department of Agriculture shall make, under rules and regulations prescribed by the Board of Agriculture, examinations of specimens of food, beverages and condiments offered for sale in North Carolina, which may be collected from time to time under their directions in various parts of the State. If it shall appear from such examination that any of the provisions of this act have been violated, the Commissioner of Agriculture shall at once certify the facts to the proper solicitor and furnish that officer a copy of the result of the analysis, duly authenticated by the analyst under oath. In all prosecutions arising under said act as amended the certificate of the chemist making the analysis or test, when duly sworn to by such analyst, shall be *prima facie* evidence of the fact or facts therein certified. If it shall appear from such examination or analysis that any of the provisions of said act have been or are being violated, the Commissioner of Agriculture shall cause to be published in the newspaper having the largest circulation in the town or city in which such violation has been committed, and in any other newspaper, in his discretion, a brief statement of the results of the examination or analysis, with the name of the person or firm having committed such violation, and the name of the person or firm manufacturing or packing such product.

SEC. 4. That it shall be the duty of every solicitor to whom the Commissioner of Agriculture shall report any violation of this act to cause proceedings to be commenced and prosecuted without delay for the fines and penalties in such cases provided.

SEC. 5. That the term "food" as used herein shall include all articles used for food, candy, condiment or drink by man or domestic animals, whether simple, mixed or compound. The term "misbranded" as herein used shall include all articles of food or articles which enter into the composition of food, the package or label of which shall bear any statement purporting to name any ingredients or substances as being contained or not being contained in such article, which statement shall be false in any particular.

SEC. 6. That for the purpose of this act an article of food shall be deemed adulterated—

First. If any substance or substances has or have been mixed or packed with it so as to reduce or lower or injuriously affect its quality or strength so that such product when offered for sale shall deceive or tend to deceive the purchaser.

Second. If any inferior substance or substances has or have been substituted, wholly or in part, for the article, so that the product when sold shall deceive or tend to deceive the purchaser.

Third. If any valuable constituent of the article has been wholly or in part abstracted so that the product when sold shall deceive or tend to deceive the purchaser.

Fourth. If it be an imitation of and sold under the specific name of another article.

Fifth. If it be mixed, colored, powdered, coated, polished or stained in a manner whereby damage or inferiority is concealed, so that such product when sold shall deceive or tend to deceive the purchaser.

Sixth. If it contain any added poisonous ingredient or any ingredient which may render such article injurious to the health of the person consuming it.

If it contain any of the following substances, which are hereby declared deleterious and dangerous to health when added to human food, to-wit: Colors which contain antimony, arsenic, barium, lead, cadmium, chromium, copper, mercury, uranium or zinc: or the following colors: gamboge, coralline, picric acid, aniline, or any of the coal-tar dyes: saccharine, dulein, gluein or any artificially or synthetically prepared substitute for sugar; paraffine, formaldehyde, beta-naphthol, abristol, benzoic acid or benzoates, salicylic acid or salicylates, boric acid or borates, sulphurous acid or sulphites, hydrofluoric acid or any fluorine compounds, sulphuric acid or potassium sulphate or wood alcohol: *Provided*, that catsups and condimental sauces may, when the fact is plainly and legibly stated in the English language on the wrapper and label of the package in which it is retailed, contain not to exceed two-tenths of one per cent of benzoic acid or its equivalent in sodium benzoate. Fermented liquors may contain not to exceed two-tenths of one per cent

of combined sulphuric acid and not to exceed eight-thousandths of one per cent of sulphurous acid.

Seventh. If it be labeled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when branded so, or an imitation, either in package or label, of an established proprietary product which has been trademarked or patented.

Eighth. If it consists of the whole or any part of a diseased, filthy, decomposed or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal or of an animal that has died otherwise than by slaughter.

In cases of meats, oysters or fish sold or offered for sale in the fresh state, if such meats, oysters or fish shall have been inoculated, dusted, powdered, sprayed, rubbed, anointed, washed, sprinkled or fumigated or in any manner treated with any of the substances declared deleterious and dangerous by this act, or with any antiseptic or chemical preservative or dye-stuff whatsoever whose use and apparent purpose is to retard, prevent or mask decomposition or to give to the meat, oysters or fish a false appearance of freshness or quality. In addition to the ways already provided, sausage shall be deemed adulterated if it is composed in any part of liver, lungs, kidneys or other viscera of animals: *Provided*, that the use of animal intestines as sausage casings shall not be deemed an adulteration.

Ninth. That candies and chocolate may be deemed to be adulterated if they contain terra alba, barytes, talc, chrome yellow or other mineral substances or poisonous colors or flavors or other ingredients deleterious or detrimental to health: *Provided*, that an article of food, beverage or condiment which does not contain any added poisonous ingredient shall not be deemed to be adulterated in the following cases:

First. In the case of articles, mixtures or compounds which may be now or from time to time hereafter known as articles of food, beverages or condiments under their own distinctive names and not included in definition fourth of this section.

Second. In the case of articles labeled, branded or tagged so as to plainly indicate that they are mixtures, compounds, combinations, imitations or blends.

Third. When any matter or ingredient has been added to the food, beverage or condiment because the same is required for the production or preparation thereof as an article of commerce in a state fit for carriage or consumption, and not fraudulently to increase the bulk, weight or measure of the food, beverage or condiment or conceal the inferior quality thereof: *Provided*, that the same shall be labeled, branded or tagged as prescribed by the Board of Agriculture, so as to show them to be compounds and the exact character thereof: *And provided further*, that nothing in this act shall be construed as requiring or compelling proprietors or manufacturers of proprietary foods to disclose their trade formulas except in so far as the provisions of this act may require to secure freedom from adulteration or imitation: *Provided further*, that nothing in this act shall be construed to apply to proprietary or patent medicines.

Fourth. Where the food, beverage or condiment is unavoidably mixed with some harmless extraneous matter in the process of collection or preparation: *Provided further*, that no person shall be convicted under the provisions of this act when he is able to prove a written guaranty of purity in a form approved by the Board of Agriculture as published in their rules and regulations, signed by the wholesale jobber, manufacturer or other party from whom he purchased said article.

SEC. 7. That the Board of Agriculture is hereby authorized to cause all compounds, mixtures or blended products to be properly branded and prescribe how this shall be done.

SEC. 8. That it shall be the duty of the Board of Agriculture to prepare and publish from time to time lists of the articles, mixtures or compounds declared to be exempt from the provisions of this act in accordance with section 6. The Board of Agriculture shall also from time to time fix and publish the limits of variability permissible in any article of food, beverage or condiment, and these standards, when so published, shall remain the standards before all courts: *Provided*, that when standards have been or may be fixed by the Secretary of Agriculture of the United States they shall be accepted by the Board of Agriculture and published as the standards for North Carolina.

SEC. 9. That every person who exposes for sale or delivers to a purchaser any condiment, beverage or article of food shall furnish, within business hours and upon tender and full payment of the selling price, a sample of such condiments, beverages or article of food to any person duly authorized by the Board of Agriculture to secure the same and who shall apply to such manufacturer or vendor or person delivering to a purchaser such beverage or article of food for such sample for such use in such sufficient quantity for the analysis of such article or articles in his possession.

SEC. 10. That any manufacturer or dealer who refuses to comply, upon demand, with the requirements of section 9 of this act, or any manufacturer, dealer or person who shall impede, obstruct, hinder or otherwise prevent or attempt to prevent any chemist, inspector or other person in the performance of his duty in connection with this act shall be guilty of a misdemeanor, and shall upon conviction be fined not less than ten dollars nor more than one hundred dollars, or be imprisoned not more than one hundred days, or both, in the discretion of the court, and said fines, less the legal costs, shall be paid into the treasury of the State for the benefit of the Department of Agriculture, to be used exclusively in executing the provisions of this act.

SEC. 11. That this act shall not be construed to interfere with commerce or any interstate commerce laws of the United States.

SEC. 12. That chapter one hundred and twenty-two, Public Laws of one thousand eight hundred and ninety-five, be and the same is hereby repealed.

SEC. 13. That this act shall be in force from the first day of August, one thousand eight hundred and ninety-nine.

STANDARDS AND RULINGS OF THE BOARD OF AGRICULTURE RELATING TO FOOD UNDER THE PURE-FOOD LAW.

Rulings have been made regarding the subject of branding or labeling and preservatives, and a form of guarantee provided as required in section 6 of the law. Standards have been fixed for a considerable number of food products. Others will be made later. The following subjects have been covered, and the attention of merchants is especially called to these rulings and standards.

These standards, except for baking powders, have been adopted by the Secretary of Agriculture of the United States, acting under authority conferred by act of Congress, approved June 3, 1902, and by action of the Board of Agriculture are the official standards for North Carolina food products.

PRINCIPLES ON WHICH THE STANDARDS ARE BASED.

The general considerations which have guided the committee in preparing the standards for food products are the following:

1. The standards are expressed in the form of definitions, with or without accompanying specifications of limit in composition.

2. The main classes of food articles are defined before the subordinate classes are considered.

3. The definitions are so framed as to exclude from the articles defined substances not included in the definitions.

4. The definitions include, where possible, those qualities which make the articles described wholesome for human food.

5. A term defined in any of the several schedules has the same meaning wherever else it is used in this report.

6. The names of food products herein defined usually agree with existing American trade or manufacturing usage; but where such usage is not clearly established or where trade names confuse two or more articles for which specific designations are desirable, preference is given to one of the several trade names applied.

7. Standards are based upon data representing materials produced under American conditions and manufactured by American processes or representing such varieties of foreign articles as are chiefly imported for American use.

8. The standards fixed are such that a departure of the articles to which they apply, above the maximum or below the minimum limit prescribed, is evidence that such articles are of inferior or abnormal quality.

9. The limits fixed as standard are not necessarily the extremes authentically recorded for the article in question, because such extremes are commonly due to abnormal conditions of production and are usually accompanied by marks of inferiority or abnormality readily perceived by the producer or manufacturer.

FOOD STANDARDS.

1. ANIMAL PRODUCTS.

A. MEATS AND THE PRINCIPAL MEAT PRODUCTS.

a. MEATS.

1. *Meat, flesh*, is any clean, sound, dressed, and properly prepared edible part of animals in good health at the time of slaughter, and if it bears a name descriptive of its kind, composition, or origin, it corresponds thereto. The term "animals," as herein used, includes not only mammals, but fish, fowl, crustaceans, mollusks, and all other animals used as food.

2. *Fresh meat* is meat from animals recently slaughtered and properly cooled until delivered to the consumer.

3. *Cold-storage meat* is meat from animals recently slaughtered and preserved by refrigeration until delivered to the consumer.*

4. *Salted, pickled, and smoked meats* are unmixed meats preserved by salt, sugar, vinegar, spices, or smoke, singly or in combination, whether in bulk or in suitable containers.†

b. MANUFACTURED MEATS.

1. *Manufactured meats* are meats not included in paragraphs 2, 3, and 4, whether simple or mixed, whole or comminuted, in bulk or in suitable containers,‡ with or without the addition of salt, sugar, vinegar, spices, smokes, oils, or rendered fat. If they bear names descriptive of kind, composition, or origin, they correspond thereto and when bearing such descriptive names, if force or flavoring meats are used, the kind and quantity thereof are made known.

C. MEAT EXTRACTS, MEAT PEPTONES, ETC.

(Schedule in preparation).

d. LARD.

1. *Lard* is the rendered fresh fat from hogs in good health at the time of slaughter, is clean, free from rancidity, and contains, necessarily incorporated in the process of rendering, not more than one (1) per cent of substances, other than fatty acids and fat.

2. *Lcaf lard* is lard rendered at moderately high temperatures from the internal fat of the abdomen of the hog, excluding that adherent to the intestines, and has an iodine number not greater than sixty (60).

3. *Neutral lard* is lard rendered at low temperatures.

* The establishment of proper periods of time for cold storage is reserved for future consideration when the investigations on this subject, authorized by Congress, are completed.

† Suitable containers for keeping moist food products such as sirups, honey, condensed milk, soups, meat extracts, meats, manufactured meats, and undried fruits and vegetables, and wrappers in contact with food products, contain on their surfaces, in contact with the food product, no lead, antimony, arsenic, zinc or copper or any compounds thereof or any other poisonous or injurious substance. If the containers are made of tin plate they are outside-soldered and the plate in no place contains less than one hundred and thirteen (113) milligrams of tin on a piece five (5) centimeters square or one and eight-tenths (1.8) grains on a piece two (2) inches square.

The inner coating of the containers is free from pin holes, blisters, and cracks.

If the tin plate is lacquered, the lacquer completely covers the tinned surface within the container and yields to the contents of the container no lead, antimony, arsenic, zinc or copper or any compounds thereof, or any other poisonous or injurious substance.

B. MILK AND ITS PRODUCTS.

a. MILKS.

1. *Milk* is the fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and ten days after calving, and contains not less than eight and one-half (8.5) per cent of solids not fat, and not less than three and one-quarter (3.25) per cent of milk fat.

2. *Blended milk* is milk modified in its composition so as to have a definite and stated percentage of one or more of its constituents.

3. *Skim milk* is milk from which a part or all of the cream has been removed and contains not less than nine and one-quarter (9.25) per cent of milk solids.

4. *Pasteurized milk* is milk that has been heated below boiling but sufficiently to kill most of the active organisms present and immediately cooled to 50° Fahr. or lower.

5. *Sterilized milk* is milk that has been heated at the temperature of boiling water or higher for a length of time sufficient to kill all organisms present.

6. *Condensed milk, evaporated milk*, is milk from which a considerable portion of water has been evaporated and contains not less than twenty-eight (28) per cent of milk solids of which not less than twenty-seven and five-tenths (27.5) per cent is milk fat.

7. *Sweetened condensed milk* is milk from which a considerable portion of water has been evaporated and to which sugar (sucrose) has been added, and contains not less than twenty-eight (28) per cent of milk solids, of which not less than twenty-seven and five-tenths (27.5) per cent is milk fat.

8. *Condensed skim milk* is skim milk from which a considerable portion of water has been evaporated.

9. *Buttermilk* is the product that remains when butter is removed from milk or cream in the process of churning.

10. *Goat's milk, ewe's milk, et cetera*, are the fresh, clean, lacteal secretions, free from colostrum, obtained by the complete milking of healthy animals other than cows, properly fed and kept, and conform in name to the species of animal from which they are obtained.

b. CREAM.

1. *Cream* is that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean and contains not less than eighteen (18) per cent of milk fat.

2. *Evaporated cream, clotted cream*, is cream from which a considerable portion of water has been evaporated.

c. MILK FAT OR BUTTER FAT.

1. *Milk fat, butter fat*, is the fat of milk and has a Reichert-Meissl number not less than twenty-four (24) and a specific gravity not less than 0.905 $\left(\begin{smallmatrix} 40^{\circ} \text{C.} \\ 40^{\circ} \text{C.} \end{smallmatrix}\right)$

d. BUTTER.

1. *Butter* is the clean, non-rancid product made by gathering in any manner the fat of fresh or ripened milk or cream into a mass, which also contains a small portion of the other milk constituents, with or without salt, and contains not less than eighty-two and five-tenths (82.5) per cent of milk fat. By acts of Congress approved August 2, 1886, and May 9, 1902, butter may also contain added coloring matter.*

2. *Renovated butter, process butter*, is the product made by melting butter and reworking, without the addition or use of chemicals or any substances except milk, cream, or salt, and contains not more than sixteen (16) per cent of water and at least eighty-two and five-tenths (82.5) per cent of milk fat.

* Coloring matter of coal-tar origin is prohibited by the North Carolina Food Law.

e. CHEESE.

1. *Cheese* is the sound, solid, and ripened product made from milk or cream by coagulating the casein thereof with rennet or lactic acid, with or without the addition of ripening ferments and seasoning, and contains, in the water-free substances, not less than fifty (50) per cent of milk fat. By act of Congress, approved June 6, 1896, cheese may also contain added coloring matter.

2. *Skim milk cheese* is the sound, solid, and ripened product, made from skim milk by coagulating the casein thereof with rennet or lactic acid, with or without the addition of ripening ferments and seasoning.

3. *Goat's milk cheese, ewe's milk cheese, et cetera*, are the sound, ripened products made from the milks of the animals specified, by coagulating the casein thereof with rennet or lactic acid, with or without the addition of ripening ferments and seasoning.

f. ICE CREAMS.

1. *Ice cream* is a frozen product made from cream and sugar, with or without a natural flavoring, and contains not less than fourteen (14) per cent of milk fat.

2. *Fruit ice cream* is a frozen product made from cream, sugar, and sound, clean, mature fruits, and contains not less than twelve (12) per cent of milk fat.

3. *Nut ice cream* is a frozen product made from cream, sugar, and sound, non-rancid nuts, and contains not less than twelve (12) per cent of milk fat.

g. MISCELLANEOUS MILK PRODUCTS.

1. *Whey* is the product remaining after the removal of fat and casein from milk in the process of cheese-making.

2. *Kumiss* is the product made by the alcoholic fermentation of mare's or cow's milk.

II. VEGETABLE PRODUCTS.

A. GRAIN PRODUCTS.

a. GRAINS AND MEALS.

1. *Grain* is the full matured, clean, sound, air-dry seed of wheat, maize, rice, oats, rye, buckwheat, barley, sorghum, millet, or spelt.

2. *Meal* is the clean, sound product made by grinding grain.

3. *Flour* is the fine, clean, sound product made by bolting wheat meal and contains not more than thirteen and one-half (13.5) per cent of moisture, not less than one and twenty-five hundredths (1.25) per cent nitrogen, not more than one (1) per cent of ash, and not more than fifty hundredths (0.50) per cent of fiber.

4. *Graham flour* is unbolted wheat meal.

5. *Gluten flour* is the clean, sound product made from flour by the removal of starch and contains not less than five and six-tenths (5.6) per cent of nitrogen and not more than ten (10) per cent of moisture.

6. *Maize meal, corn meal, Indian corn meal*, is meal made from sound maize grain and contains not more than fourteen (14) per cent of moisture, not less than one and twelve hundredths (1.12) per cent of nitrogen, and not more than one and six-tenths (1.6) per cent of ash.

7. *Rice* is the hulled, or hulled and polished grain of *Oryza sativa*.

8. *Oatmeal* is meal made from hulled oats and contains not more than twelve (12) per cent of moisture, not more than one and five-tenths (1.5) per cent of crude fiber, not less than two and twenty-four hundredths (2.24) per cent of nitrogen, and not more than two and two-tenths (2.2) per cent of ash.

9. *Rye flour* is the fine, clean, sound product made by bolting rye meal and contains not more than thirteen and one-half (13.5) per cent of moisture, not less than one and thirty-six hundredths (1.36) per cent of nitrogen, and not more than one and twenty-five hundredths (1.25) per cent of ash.

10. *Buckwheat flour* is bolted buckwheat meal and contains not more than twelve (12) per cent of moisture, not less than one and twenty-eight hundredths (1.28) per cent of nitrogen, and not more than one and seventy-five hundredths (1.75) per cent of ash.

B. FRUIT AND VEGETABLES.

a. FRUIT AND FRUIT PRODUCTS.

(Except fruit juices, fresh, sweet, and fermented, and vinegars).

1. *Fruits* are the clean, sound, edible, fleshy fructifications of plants, distinguished by their sweet, acid, and ethereal flavors.

2. *Dried fruit* is the clean, sound product made by drying mature, properly prepared, fresh fruit in such a way as to take up no harmful substance, and conforms in name to the fruit used in its preparation; *sun-dried fruit* is dried fruit made by drying without the use of artificial means; *evaporated fruit* is dried fruit made by drying with the use of artificial means.

3. *Evaporated apples* are evaporated fruit made from peeled and cored apples, and contain not more than twenty-seven (27) per cent of moisture determined by the usual commercial method of drying four (4) hours at the temperature of boiling water.

(Standards for other dried fruits are in preparation).

4. *Canned fruit* is the sound product made by sterilizing clean, sound, properly matured and prepared fresh fruit, by heating, with or without sugar (sucrose) and spices, and keeping in suitable, clean, hermetically sealed containers and conforms in name to the fruit used in its preparation.

5. *Preserve** is the sound product made from clean, sound, properly matured and prepared fresh fruit and sugar (sucrose) sirup, with or without spices or vinegar, and conforms in name to that of the fruit used, and in its preparation not less than forty-five (45) pounds of fruit are used to each fifty-five (55) pounds of sugar.

6. *Honey preserve** is preserve in which honey is used in place of sugar (sucrose) sirup.

7. *Glucose preserve** is preserve in which a glucose product is used in place of sugar (sucrose) sirup.

8. *Jam, marmalade,** is the sound product made from clean, sound, properly matured and prepared fresh fruit and sugar (sucrose), with or without spices or vinegar, by boiling to a pulpy or semisolid consistence, and conforms in name to the fruit used, and in its preparation not less than forty-five (45) pounds of fruit are used to each fifty-five (55) pounds of sugar.

9. *Glucose jam, glucose marmalade,** is jam in which a glucose product is used in place of sugar (sucrose).

10. *Fruit butter** is the sound product made from fruit juice and clean, sound, properly matured and prepared fruit, evaporated to a semisolid mass of homogeneous consistence, with or without the addition of sugar and spices or vinegar, and conforms in name to the fruit used in its preparation.

11. *Glucose fruit butter** is fruit butter in which a glucose product is used in place of sugar (sucrose).

12. *Jelly** is the sound, semisolid, gelatinous product made by boiling clean, sound, properly matured and prepared fresh fruit with water, concentrating the expressed and strained juice, to which sugar (sucrose) is added, and conforms in name to the fruit used in its preparation.

13. *Glucose jelly** is jelly in which a glucose product is used in place of sugar (sucrose).

b. VEGETABLES AND VEGETABLE PRODUCTS.

1. *Vegetables* are the succulent, clean, sound, edible parts of the herbaceous plants used for culinary purposes.

2. *Dried vegetables* are the clean, sound products made by drying properly matured and prepared vegetables in such a way as to take up no harmful substance, and conform in name to the vegetables used in their preparation; *sun-dried vegetables* are dried vegetables made by drying without the use of artificial means; *craporated vegetables* are dried vegetables made by drying with the use of artificial means.

* Products made with mixtures of sugar, glucose, and honey, or any two thereof, are reserved for future consideration.

3. *Canned vegetables* are sound, properly matured and prepared fresh vegetables, with or without salt, sterilized by heat, with or without previous cooking in vessels from which they take up no metallic substance, kept in suitable, clean, hermetically sealed containers, are sound and conform in name to the vegetables used in their preparation.

4. *Pickles* are clean, sound, immature cucumbers, properly prepared, without taking up any metallic compound other than salt, and preserved in any kind of vinegar, with or without spices; *pickled onions*, *pickled beets*, *pickled beans*, and other pickled vegetables are vegetables prepared as described above, and conform in name to the vegetables used.

5. *Salt pickles* are clean, sound, immature cucumbers, preserved in a solution of common salt, with or without spices.

6. *Succet pickles* are pickled cucumbers or other vegetables in the preparation of which sugar (sucrose) is used.

7. *Sauerkraut* is clean, sound, properly prepared cabbage, mixed with salt, and subjected to fermentation.

8. *Catchup* (*ketchup*, *catsup*) is the clean, sound product made from the properly prepared pulp of clean, sound, fresh, ripe tomatoes, with spices and with or without sugar and vinegar; *mushroom catchup*, *walnut catchup*, *et cetera*, are catchups made as above described, and conform in name to the substances used in their preparation.

C. SUGARS AND RELATED SUBSTANCES.

a. SUGAR AND SUGAR PRODUCTS.

SUGARS.

1. *Sugar* is the product chemically known as sucrose (saccharose), chiefly obtained from sugar cane, sugar beets, sorghum, maple, and palm.

2. *Granulated*, *loaf*, *cut*, *milled*, and *powdered sugars* are different forms of sugar and contain at least ninety-nine and five-tenths (99.5) per cent of sucrose.

3. *Maple sugar* is the solid product resulting from the evaporation of maple sap, and contains, in the water-free substance, not less than sixty-five one hundredths (0.65) per cent of maple sugar ash.

4. *Masseccuite*, *melada*, *mush sugar*, and *concrete* are products made by evaporating the purified juice of a sugar-producing plant, or a solution of sugar, to a solid or semisolid consistence, and in which the sugar chiefly exists in a crystalline state.

MOLASSES AND REFINERS' SIRUP.

1. *Molasses* is the product left after separating the sugar from masseccuite, melada, mush sugar, or concrete, and contains not more than twenty-five (25) per cent of water and not more than five (5) per cent of ash.

2. *Refiners' sirup*, *treacle*, is the residual liquid product obtained in the process of refining raw sugars and contains not more than twenty-five (25) per cent of water and not more than eight (8) per cent of ash.

SIRUP.

1. *Sirup* is the sound product made by purifying and evaporating the juice of a sugar-producing plant without removing any of the sugar.

2. *Sugar-cane sirup* is sirup made by the evaporation of the juice of the sugar-cane or by the solution of sugar-cane concrete, and contains not more than thirty (30) per cent of water and not more than two and five-tenths (2.5) per cent of ash.

3. *Sorghum sirup* is sirup made by the evaporation of sorghum juice or by the solution of sorghum concrete, and contains not more than thirty (30) per cent of water and not more than two and five-tenths (2.5) per cent of ash.

4. *Maple sirup* is sirup made by the evaporation of maple sap or by the solution of maple concrete, and contains not more than thirty-two (32) per cent of water and not less than forty-five hundredths (0.45) per cent of maple sirup ash.

5. *Sugar sirup* is the product made by dissolving sugar to the consistence of a sirup and contains not more than thirty-five (35) per cent of water.

b. GLUCOSE PRODUCTS.

1. *Starch sugar* is the solid product made by hydrolyzing starch or a starch-containing substance until the greater part of the starch is converted into dextrose. Starch sugar appears in commerce in two forms, anhydrous starch sugar and hydrous starch sugar. The former, crystallized without water of crystallization, contains not less than ninety-five (95) per cent of dextrose and not more than eight-tenths (0.8) per cent of ash. The latter, crystallized with water of crystallization, is of two varieties—70 sugar, also known as brewers' sugar, contains not less than seventy (70) per cent of dextrose and not more than eight-tenths (0.8) per cent of ash; 80 sugar, climax or acme sugar, contains not less than eighty (80) per cent of dextrose and not more than one and one-half (1.5) per cent of ash.

The ash of all these products consists almost entirely of chlorids and sulphates.

2. *Glucose, mixing glucose, confectioner's glucose*, is a thick, sirupy, colorless product made by incompletely hydrolyzing starch, or a starch-containing substance, and decolorizing and evaporating the product. It varies in density from forty-one (41) to forty-five (45) degrees Baumé at a temperature of 100° Fahr. (37.7° C.), and conforms in density, within these limits, to the degree Baumé it is claimed to show, and for a density of forty-one (41) degrees Baumé contains not more than twenty-one (21) per cent and for a density of forty-five (45) degrees not more than fourteen (14) per cent of water. It contains on a basis of forty-one (41) degrees Baumé not more than one (1) per cent of ash, consisting chiefly of chlorids and sulphates.

c. CANDY.

1. *Candy* is a product made from a saccharine substance or substances with or without the addition of harmless coloring, flavoring, or filling materials and contains no terra alba, barytes, tale, chrome yellow, or other mineral substances, or poisonous colors or flavors, or other ingredients deleterious or detrimental to health, or any vinous, malt, or spirituous liquor or compound, or narcotic drug.

d. HONEY.

1. *Honey* is the nectar and saccharine exudations of plants gathered, modified, and stored in the comb by honey bees (*Apis mellifica* and *A. dorsata*); is lavortatory, contains not more than twenty-five (25) per cent of water, not more than twenty-five hundredths (0.25) per cent of ash, and not more than eight (8) per cent of sucrose.

2. *Comb honey* is honey contained in the cells of comb.

3. *Extracted honey* is honey which has been separated from the uncrushed comb by centrifugal force or gravity.

4. *Strained honey* is honey removed from the crushed comb by straining or other means.

D. CONDIMENTS (EXCEPT VINEGAR AND SALT).

a. SPICES.

1. *Spices* are aromatic vegetable substances used for the seasoning of food and from which no portion of any volatile oil or other flavoring principle has been removed and which are clean, sound, and true to name.

2. *Allspice, pimento*, is the dried fruit of the *Pimenta pimenta* (L.) Karst., and contains not less than eight (8) per cent of quercitanic acid*: not more than six (6) per cent of total ash, not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than twenty-five (25) per cent of crude fiber.

3. *Anise* is the fruit of the *Pimpinella anisum* L.

4. *Bay leaf* is the dried leaf of *Laurus nobilis* L.

5. *Capers* are the flower buds of *Capparis spinosa* L.

6. *Caraway* is the fruit of *Carum carvi* L.

CAYENNE and RED PEPPER.

7. *Red pepper* is the red, dried, ripe fruit of any species of *Capsicum*.

8. *Cayenne pepper, cayenne*, is the dried ripe fruit of *Capsicum frutescens* L., *Capsicum baccatum* L., or some other small-fruited species of *Capsicum*, and con-

* Calculated from the total oxygen absorbed by the aqueous extract.

tains not less than fifteen (15) per cent of nonvolatile ether extract, not more than six and five-tenths (6.5) per cent of total ash; not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid; not more than one and five-tenths (1.5) per cent of starch, and not more than twenty-eight (28) per cent of crude fiber.

9. *Paprika* is the dried ripe fruit of *Capsicum annuum* L., or some other large-fruited species of *Capsicum*, excluding seeds and stems.

10. *Celery seed* is the dried fruit of *Apium graveolens* L.

11. *Cinnamon* is the dried bark of any species of the genus *Cinnamomum* from which the outer layers may or may not have been removed.

12. *True cinnamon* is the dried inner bark of *Cinnamomum zeylanicum* Breyne.

13. *Cassia* is the dried bark of various species of *Cinnamomum*, other than *Cinnamomum zeylanicum*, from which the outer layers may or may not have been removed.

14. *Cassia buds* are the dried immature fruit of species of *Cinnamomum*.

15. *Ground cinnamon, ground cassia*, is a powder consisting of cinnamon, cassia, or cassia buds, or a mixture of these spices, and contains not more than six (6) per cent of total ash and not more than two (2) per cent of sand.

16. *Cloves* are the dried flower buds of *Caryophyllus aromaticus* L., which contain not more than five (5) per cent of clove stems; not less than ten (10) per cent of volatile ether extract; not less than twelve (12) per cent of quercitannic acid*; not more than eight (8) per cent of total ash; not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than ten (10) per cent of crude fiber.

17. *Coriander* is the dried fruit of *Coriandrum sativum* L.

18. *Cumin seed* is the fruit of *Cuminum cyminum* L.

19. *Dill seed* is the fruit of *Anethum graveolens* L.

20. *Fennel* is the fruit of *Foeniculum foeniculum* (L.) Karst.

21. *Ginger* is the washed and dried or decorticated and dried rhizome of *Zinziber zingiber* (L.) Karst., and contains not less than forty-two (42) per cent of starch; not more than eight (8) per cent of crude fiber, not more than six (6) per cent of total ash, not more than one (1) per cent of lime, and not more than three (3) per cent of ash insoluble in hydrochloric acid.

22. *Limed ginger, bleached ginger*, is whole ginger coated with carbonate of lime and contains not more than ten (10) per cent of ash, not more than four (4) per cent of carbonate of lime, and conforms in other respects to the standard for ginger.

23. *Horse-radish* is the root of *Roripia armoracia* (L.) Hitchcock, either by itself or ground and mixed with vinegar.

24. *Mace* is the dried arillus of *Myristica fragrans* Houttuyn, and contains not less than twenty (20) nor more than thirty (30) per cent of nonvolatile ether extract, not more than three (3) per cent of total ash, and not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than ten (10) per cent of crude fiber.

25. *Macassar mace, Papua mace*, is the dried arillus of *Myristica argentea* Warb.

26. *Bombay mace* is the dried arillus of *Myristica malabarica* Lamarek.

27. *Marjorum* is the leaf, flower and branch of *Majorana majorana* (L.) Karst.

28. *Mustard seed* is the seed of *Sinapis alba* L. (white mustard), *Brassica nigra* (L.) Koch (black mustard), or *Brassica juncea* (L.) Cosson (black or brown mustard).

29. *Ground mustard* is a powder made from mustard seed, with or without the removal of the hulls and a portion of the fixed oil, and contains not more than two and five-tenths (2.5) per cent of starch and not more than eight (8) per cent of total ash.

30. *Prepared mustard, German mustard, French mustard, mustard paste*, is a paste composed of a mixture of ground mustard seed or mustard flour with salt, spices and vinegar, and, calculated free from water, fat and salt, contains not more than twenty-four (24) per cent of carbohydrates, calculated as starch, deter-

* Calculated from the total oxygen absorbed by the aqueous extract.

mined according to the official methods, not more than twelve (12) per cent of crude fiber nor less than thirty-five (35) per cent of protein, derived solely from the materials named.

31. *Nutmeg* is the dried seed of the *Myristica fragrans* Houttuyn, deprived of its testa, with or without a thin coating of lime, and contains not less than twenty-five (25) per cent of nonvolatile ether extract, not more than five (5) per cent of total ash, not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than ten (10) per cent of crude fiber.

32. *Macassar nutmeg*, *Papua nutmeg*, *male nutmeg*, *long nutmeg*, is the dried seed of *Myristica argentea* Warb. deprived of its testa.

PEPPER.

33. *Black pepper* is the dried immature berry of *Piper nigrum* L. and contains not less than six (6) per cent of nonvolatile ether extract, not less than twenty-five (25) per cent of starch, not more than seven (7) per cent of total ash, not more than two (2) per cent of ash insoluble in hydrochloric acid, and not more than fifteen (15) per cent of crude fiber. One hundred parts of the nonvolatile ether extract contains not less than three and one-quarter (3.25) parts of nitrogen. *Ground black pepper* is the product made by grinding the entire berry and contains the several parts of the berry in their normal proportions.

34. *Long pepper* is the dried fruit of *Piper longum* L.

35. *White pepper* is the dried mature berry of *Piper nigrum* L. from which the outer coating or the outer and inner coatings have been removed and contains not less than six (6) per cent of nonvolatile ether extract, not less than fifty (50) per cent of starch, not more than four (4) per cent of total ash, not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than five (5) per cent of crude fiber. One hundred parts of the nonvolatile ether extract contain not less than four (4) parts of nitrogen.

36. *Saffron* is the dried stigma of *Crocus sativus* L.

37. *Sage* is the leaf of *Salvia officinalis* L.

38. *Savory*, *Summer Savory* is the leaf, blossom, and branch of *Satureja hortensis* L.

39. *Thyme* is the leaf and tip of blooming branches of *Thymus vulgaris* L.

b. FLAVORING EXTRACTS.

1. A *flavoring extract** is a solution in ethyl alcohol of proper strength of the sapid and odorous principles derived from an aromatic plant, or parts of the plant, with or without its coloring matter, and conforms in name to the plant used in its preparation.

2. *Almond extract* is the flavoring extract prepared from oil of bitter almonds, free from hydrocyanic acid, and contains not less than one (1) per cent by volume of oil of bitter almonds.

2a. *Oil of bitter almonds*, commercial, is the volatile oil obtained from the seed of the bitter almond (*Amygdalus communis* L.), the apricot (*Prunus armeniaca* L.), or the peach (*Amygdalus persica* L.).

3. *Anise extract* is the flavoring extract prepared from oil of anise, and contains not less than three (3) per cent by volume of oil of anise.

3a. *Oil of anise* is the volatile oil obtained from the anise seed.

4. *Celery seed extract* is the flavoring extract prepared from celery seed or the oil of celery seed, or both, and contains not less than three-tenths (0.3) per cent by volume of oil or celery seed.

4a. *Oil of celery seed* is the volatile oil obtained from celery seed.

5. *Cassia extract* is the flavoring extract prepared from oil of cassia and contains not less than two (2) per cent by volume of oil of cassia.

5a. *Oil of cassia* is the lead-free volatile oil obtained from the leaves or bark of *Cinnamomum cassia* Bl., and contains not less than seventy-five (75) per cent by weight of cinnamic aldehyde.

* The flavoring extracts herein described are intended solely for food purposes and are not to be confounded with similar preparations described in the Pharmacopœia for medicinal purposes.

6. *Cinnamon extract* is the flavoring extract prepared from oil of cinnamon, and contains not less than two (2) per cent by volume of oil of cinnamon.

6a. *Oil of cinnamon* is the lead-free volatile oil obtained from the bark of the Ceylon cinnamon (*Cinnamomum zeylanicum* Breyn), and contains not less than sixty-five (65) per cent by weight of cinnamic aldehyde and not more than ten (10) per cent by weight of eugenol.

7. *Clove extract* is the flavoring extract prepared from oil of cloves, and contains not less than two (2) per cent by volume of oil of cloves.

7a. *Oil of cloves* is the lead-free, volatile oil obtained from cloves.

8. *Ginger extract* is the flavoring extract prepared from ginger and contains in each one hundred (100) cubic centimeters the alcohol-soluble matters from not less than twenty (20) grams of ginger.

9. *Lemon extract* is the flavoring extract prepared from oil of lemon, or from lemon peel, or both, and contains not less than five (5) per cent by volume of oil of lemon.

9a. *Oil of lemon* is the volatile oil obtained by expression or alcoholic solution, from the fresh peel of the lemon (*Citrus limonum* L.), has an optical rotation (25° C.) of not less than +60° in a 100-millimeter tube, and contains not less than four (4) per cent by weight of citral.

10. *Terpeneless extract of lemon* is the flavoring extract prepared by shaking oil of lemon with dilute alcohol, or by dissolving terpeneless oil of lemon in dilute alcohol, and contains not less than two-tenths (0.2) per cent by weight of citral derived from oil of lemon.

10a. *Terpeneless oil of lemon* is oil of lemon from which all or nearly all of the terpenes have been removed.

11. *Nutmeg extract* is the flavoring extract prepared from oil of nutmeg, and contains not less than (2) per cent by volume of oil of nutmeg.

11a. *Oil of nutmeg* is the volatile oil obtained from nutmegs.

12. *Orange extract* is the flavoring extract prepared from oil of orange, or from orange peel, or both, and contains not less than five (5) per cent by volume of oil of orange.

12a. *Oil of orange* is the volatile oil obtained, by expression or alcoholic solution, from the fresh peel of the orange (*Citrus aurantium* L.) and has an optical rotation (25° C.) of not less than +95° in a 100-millimeter tube.

13. *Terpeneless extract of orange* is the flavoring extract prepared by shaking oil of orange with dilute alcohol, or by dissolving terpeneless oil of orange in dilute alcohol, and corresponds in flavoring strength to orange extract.

13a. *Terpeneless oil of orange* is oil of orange from which all or nearly all of the terpenes have been removed.

14. *Peppermint extract* is the flavoring extract prepared from oil of peppermint, or from peppermint, or both, and contains not less than three (3) per cent by volume of oil of peppermint.

14a. *Peppermint* is the leaves and flowering tops of *Mentha piperita* L.

14b. *Oil of peppermint* is the volatile oil obtained from peppermint and contains not less than fifty (50) per cent by weight of menthol.

15. *Rose extract* is the flavoring extract prepared from otto of roses, with or without red rose petals, and contains not less than four-tenths (0.4) per cent by volume of otto of roses.

15a. *Otto of roses* is the volatile oil obtained from the petals of *Rosa damascena* Mill., *R. centifolia* L., or *R. moschata* Herrm.

16. *Savory extract* is the flavoring extract prepared from oil of savory, or from savory, or both, and contains not less than thirty-five hundredths (0.35) per cent by volume of oil of savory.

16a. *Oil of savory* is the volatile oil obtained from savory.

17. *Spearmint extract* is the flavoring extract prepared from oil of spearmint, or from spearmint, or both, and contains not less than three (3) per cent by volume of oil of spearmint.

17a. *Spearmint* is the leaves and flowering tops of *Mentha spicata* L.

17b. *Oil of spearmint* is the volatile oil obtained from spearmint.

18. *Star anise extract* is the flavoring extract prepared from oil of star anise, and contains not less than three (3) per cent by volume of oil of star anise.

18a. *Oil of star anise* is the volatile oil distilled from the fruit of the star anise (*Illicium verum* Hook).

19. *Sweet basil extract* is the flavoring extract prepared from oil of sweet basil, or from sweet basil, or both, and contains not less than one-tenth (0.1) per cent by volume of oil of sweet basil.

19a. *Sweet basil, basil*, is the leaves and tops of *Ocimum basilicum* L.

19b. *Oil of sweet basil* is the volatile oil obtained from basil.

20. *Sweet marjoram extract, marjoram extract*, is the flavoring extract prepared from the oil of marjoram, or from marjoram, or both, and contains not less than one (1) per cent by volume of oil of marjoram.

20a. *Oil of marjoram* is the volatile oil obtained from marjoram.

21. *Thyme extract* is the flavoring extract prepared from oil of thyme, or from thyme, or both, and contains not less than two-tenths (0.2) per cent by volume of oil of thyme.

21a. *Oil of thyme* is the volatile oil obtained from thyme.

22. *Tonka extract* is the flavoring extract prepared from tonka bean, with or without sugar or glycerin, and contains not less than one-tenth (0.1) per cent by weight of coumarin extracted from the tonka bean, together with a corresponding proportion of the other soluble matters thereof.

22a. *Tonka bean* is the seed of *Coumarouna odorata* Aublet (*Dipteryx odorata* (Aubl.) Willd.).

23. *Vanilla extract* is the flavoring extract prepared from vanilla bean, with or without sugar or glycerin, and contains in one hundred (100) cubic centimeters the soluble matters from not less than ten (10) grams of the vanilla bean.

23a. *Vanilla bean* is the dried, cured fruit of *Vanilla planifolia* Andrews.

24. *Wintergreen extract* is the flavoring extract prepared from oil of wintergreen, and contains not less than three (3) per cent by volume of oil of wintergreen.

24a. *Oil of wintergreen* is the volatile oil distilled from the leaves of the *Gaultheria procumbens* L.

C. EDIBLE VEGETABLE OILS AND FATS.

1. *Olive oil* is the oil obtained from the sound, mature fruit of the cultivated olive tree (*Olea europaea* L.) and subjected to the usual refining processes; is free from rancidity; has a refractive index (25° C.) not less than one and forty-six hundred and sixty ten-thousandths (1.4660) and not exceeding one and forty-six hundred and eighty ten-thousandths (1.4680); and an iodine number not less than seventy-nine (79) and not exceeding ninety (90).

2. *Virgin olive oil* is olive oil obtained from the first pressing of carefully selected, hand-picked olives.

3. *Cotton-seed oil* is the oil obtained from the seeds of cotton plants (*Gossypium hirsutum* L., *G. barbadense* L., or *G. herbaceum* L.) and subjected to the usual refining processes; is free from rancidity; has a refractive index (25° C.) not less than one and forty-seven hundred ten-thousandths (1.4700) and not exceeding one and forty-seven hundred and twenty-five ten-thousandths (1.4725); and an iodine number not less than one hundred and four (104) and not exceeding one hundred and ten (110).

4. *"Winter-yellow" cotton-seed oil* is expressed cotton-seed oil from which a portion of the stearin has been separated by chilling and pressure, and has an iodine number not less than one hundred and ten (110) and not exceeding one hundred and sixteen (116).

5. *Peanut oil, arachis oil, earthenut oil*, is the oil obtained from the peanut (*Arachis hypogaea* L.) and subjected to the usual refining processes; is free from rancidity; has a refractive index (25° C.) not less than one and forty-six hundred and ninety ten-thousandths (1.4690) and not exceeding one and forty-seven hundred and seven ten-thousandths (1.4707); and an iodine number not less than eighty-seven (87) and not exceeding one hundred (100).

6. *"Cold-drawn" peanut oil** is peanut oil obtained by pressure without heating.

7. *Sesame oil, gingili oil, teel oil*, is the oil obtained from the seeds of the sesame plants (*Sesamum orientale* L. and *S. radiatum* Schum. and Thonn.) and subjected to the usual refining processes; is free from rancidity; has a refractive index (25° C.) not less than one and forty-seven hundred and four ten-thousandths (1.4704) and not exceeding one and forty-seven hundred and seventeen ten-thousandths (1.4717); and an iodine number not less than one hundred and three (103) and not exceeding one hundred and twelve (112).

8. "*Cold-drawn*" *sesame oil** is sesame oil obtained by pressure without heating.

9. *Poppy-seed oil** is the oil obtained from the seed of the poppy (*Papaver somniferum* L.) subjected to the usual refining processes and free from rancidity.

10. *White poppy-seed oil*, "*cold-drawn*" *poppy-seed oil*,* is poppy-seed oil of the first pressing without heating.

11. *Cocconut oil** is the oil obtained from the kernels of the cocconut (*Cocos nucifera* L.) and subjected to the usual refining processes and free from rancidity.

12. *Cochin oil* is cocconut oil prepared in Cochin (Malabar).

13. *Ceylon oil* is cocconut oil prepared in Ceylon.

14. *Copra oil* is cocconut oil prepared from copra, the dried kernels of the cocconut.

15. *Rape-seed oil*, *colza oil*,* is the oil obtained from the seed of the rape plant (*Brassica napus* L.) and subjected to the usual refining processes and free from rancidity.

16. "*Cold-drawn*" *rape-seed oil** is rape-seed oil obtained by the first pressing without heating.

17. *Sunflower oil** is the oil obtained from the seeds of the sunflower (*Helianthus annuus* L.) and subjected to the usual refining processes and free from rancidity.

18. "*Cold-drawn*" *sunflower oil** is sunflower oil obtained by the first pressing without heating.

19. *Maize oil*, *corn oil*,* is the oil obtained from the germ of the maize (*Zea mays* L.) and subjected to the usual refining processes and free from rancidity.

20. *Cocoa butter*, *cacao butter*, is the fat obtained from roasted, sound cocoa beans, and subjected to the usual refining processes; is free from rancidity; has a refractive index (40° C.) not less than one and forty-five hundred and sixty-six ten-thousandths (1.4566) and not exceeding one and forty-five hundred and ninety-eight ten-thousandths (1.4598); an iodine number not less than thirty-three (33) and not exceeding thirty-eight (38); and a melting point not lower than 30° C. nor higher than 35° C.

21. *Cotton-seed oil stearin* is the solid product made by chilling cotton-seed oil and separating the solid portion by filtration, with or without pressure, and having an iodine number not less than eighty-five (85) and not more than one hundred (100).

E. TEA, COFFEE, AND COCOA PRODUCTS.

a. TEA.

1. *Tea* is the leaves and leaf buds of different species of *Thea*, prepared by the usual trade processes of fermenting, drying, and firing; meets the provisions of the act of Congress approved March 2, 1897, and the regulations made in conformity therewith (Treasury Department Circular 16, February 6, 1905); conforms in variety and place of production to the name it bears; and contains not less than four (4) nor more than seven (7) per cent of ash.

b. COFFEE.

1. *Coffee* is the seed of *Coffea arabica* L. or *Coffea liberica* Bull., freed from all but a small portion of its spermoderm, and conforms in variety and place of production to the name it bears.

2. *Roasted coffee* is coffee which by the action of heat has become brown and developed its characteristic aroma, and contains not less than ten (10) per cent of fat and not less than three (3) per cent of ash.

c. COCOA AND COCOA PRODUCTS.

1. *Cocoa beans* are the seeds of the cacao tree, *Theobroma cacao* L.

2. *Cocoa nibs*, *cracked cocoa*, is the roasted, broken cocoa bean freed from its shell or husk.

3. *Chocolate*, *plain chocolate*, *bitter chocolate*, *chocolate liquor*, *bitter chocolate coatings*, is the solid or plastic mass obtained by grinding cocoa nibs without the removal of fat or other constituents except the germ, and contains not more than

* The fixing of limits for chemical and physical properties is reserved for future consideration.

three (3) per cent of ash insoluble in water, three and fifty hundredths (3.50) per cent of crude fiber, and nine (9) per cent of starch, and not less than forty-five (45) per cent of cocoa fat.

4. *Sweet chocolate, sweet chocolate coatings*, is chocolate mixed with sugar (sucrose), with or without the addition of cocoa butter, spices, or other flavoring materials, and contains in the sugar- and fat-free residue no higher percentage of either ash, fiber, or starch than is found in the sugar- and fat-free residue of chocolate.

5. *Cocoa, powdered cocoa*, is cocoa nibs, with or without the germ, deprived of a portion of its fat and finely pulverized, and contains percentages of ash, crude fiber, and starch corresponding to those in chocolate after correction for fat removed.

6. *Sweet cocoa, sweetened cocoa*, is cocoa mixed with sugar (sucrose), and contains not more than sixty (60) per cent of sugar (sucrose), and in the sugar- and fat-free residue no higher percentage of either ash, crude fiber, or starch than is found in the sugar- and fat-free residue of chocolate.

F. BEVERAGES.

a. FRUIT JUICES—FRESH, SWEET, AND FERMENTED.

1. FRESH AND 2. SWEET.

(Schedules in preparation).

3. FERMENTED FRUIT JUICES.

1. *Wine* is the product made by the normal alcoholic fermentation of the juice of sound, ripe grapes, and the usual cellar treatment, and contains not less than seven (7) nor more than sixteen (16) per cent of alcohol, by volume, and, in one hundred (100) cubic centimeters (20° C.), not more than one-tenth (0.1) gram of sodium chlorid nor more than two-tenths (0.2) gram of potassium sulphate; and for red wine not more than fourteen hundredths (0.14) gram, and for white wine not more than twelve hundredths (0.12) gram of volatile acids produced by fermentation and calculated as acetic acid. *Red wine* is wine containing the red coloring matter of the skins of grapes. *White wine* is wine made from white grapes or the expressed fresh juice of other grapes.

2. *Dry wine* is wine in which the fermentation of the sugars is practically complete and which contains, in one hundred (100) cubic centimeters (20° C.), less than one (1) gram of sugars and for dry red wine not less than sixteen hundredths (0.16) gram of grape ash and not less than one and six-tenths (1.6) grams of sugar-free grape solids, and for dry white wine not less than thirteen hundredths (0.13) gram of grape ash and not less than one and four-tenths (1.4) grams of sugar-free grape solids.

3. *Fortified dry wine* is dry wine to which brandy has been added, but which conforms in all other particulars to the standard of dry wine.

4. *Sweet wine* is wine in which the alcoholic fermentation has been arrested, and which contains, in one hundred (100) cubic centimeters (20° C.), not less than one (1) gram of sugars, and for sweet red wine not less than sixteen hundredths (0.16) gram of grape ash, and sweet white wine not less than thirteen hundredths (0.13) gram of grape ash.

5. *Fortified sweet wine* is sweet wine to which wine spirits have been added. By act of Congress, "sweet wine" used for making fortified sweet wine and "wine spirits" used for such fortification are defined as follows (sec. 43, Act of October 1, 1890, 26 Stat., 567, as amended by section 68, Act of August 27, 1894, 28 Stat., 509, and further amended by Act of Congress approved June 7, 1906): "That the wine spirits mentioned in section 42 of this act is the product resulting from the distillation of fermented grape juice to which water may have been added prior to, during, or after fermentation, for the sole purpose of facilitating the fermentation and economical distillation thereof, and shall be held to include the products from grapes or their residues, commonly known as grape brandy; and the pure sweet wine, which may be fortified free of tax, as provided in said section, is fermented grape juice only, and shall contain no other substance whatever introduced before, at the time of, or after fermentation, except

as herein expressly provided; and such sweet wine shall contain not less than four per centum of saccharine matter, which saccharine strength may be determined by testing with Balling's saccharometer or must scale, such sweet wine, after the evaporation of the spirits contained therein, and restoring the sample tested to original volume by addition of water: *Provided*, That the addition of pure boiled or condensed grape must or pure crystallized cane or beet sugar or pure anhydrous sugar to the pure grape juice aforesaid, or the fermented product of such grape juice prior to the fortification provided by this Act for the sole purpose of perfecting sweet wine according to commercial standard, or the addition of water in such quantities only as may be necessary in the mechanical operation of grape conveyers, crushers, and pipes leading to fermenting tanks, shall not be excluded by the definition of pure sweet wine aforesaid: *Provided, however*, That the cane or beet sugar, or pure anhydrous sugar, or water, so used shall not in either case be in excess of ten (10) per centum of the weight of the wine to be fortified under this Act: *And provided further*, That the addition of water herein authorized shall be under such regulations and limitations as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may from time to time prescribe; but in no case shall such wines to which water has been added be eligible for fortification under the provisions of this Act where the same, after fermentation and before fortification, have an alcoholic strength of less than five per centum of their volume."

6. *Sparkling wine* is wine in which the after part of the fermentation is completed in the bottle, the sediment being disgorged and its place supplied by wine or sugar liquor, and which contains, in one hundred (100) cubic centimeters (20° C.), not less than twelve hundredths (0.12) gram of grape ash.

7. *Modified wine, ameliorated wine, corrected wine*, is the product made by the alcoholic fermentation, with the usual cellar treatment, of a mixture of the juice of sound, ripe grapes with sugar (sucrose), or a sirup containing not less than sixty-five (65) per cent of sugar (sucrose), and in quantity not more than enough to raise the alcoholic strength after fermentation, to eleven (11) per cent by volume.

8. *Raisin wine* is the product made by the alcoholic fermentation of an infusion of dried or evaporated grapes, or a mixture of such infusion or of raisins with grape juice.

b. MEAD, ROOT BEER, ETC.

(Schedule in preparation).

c. MALT LIQUORS.

(Schedule in preparation).

d. SPIRITUOUS LIQUORS.

(Schedule in preparation).

e. CARBONATED WATERS, ETC.

(Schedule in preparation).

G. VINEGAR.

1. *Vinegar, cider vinegar, apple vinegar*, is the product made by the alcoholic and subsequent acetous fermentations of the juice of apples, is levo-rotatory, and contains not less than four (4) grams of acetic acid, not less than one and six-tenths (1.6) grams of apple solids, of which not more than fifty (50) per cent are reducing sugars, and not less than twenty-five hundredths (0.25) gram of apple ash in one hundred (100) cubic centimeters (20° C.); and the water-soluble ash from one hundred (100) cubic centimeters (20° C.) of the vinegar contains not less than ten (10) milligrams of phosphoric acid (P_2O_5), and requires not less than thirty (30) cubic centimeters of decinormal acid to neutralize its alkalinity.

2. *Wine vinegar, grape vinegar*, is the product made by the alcoholic and subsequent acetous fermentations of the juice of grapes and contains, in one hundred (100) cubic centimeters (20° C.), not less than four (4) grams of acetic acid,

not less than one (1.0) gram of grape solids, and not less than thirteen hundredths (0.13) gram of grape ash.

3. *Malt vinegar* is the product made by the alcoholic and subsequent acetous fermentations, without distillation, of an infusion of barley malt or cereals whose starch has been converted by malt, is dextro-rotatory, and contains, in one hundred (100) cubic centimeters (20° C.), not less than four (4) grams of acetic acid, not less than two (2) grams of solids, and not less than two-tenths (0.2) gram of ash; and the water soluble ash from one hundred (100) cubic centimeters (20° C.) of the vinegar contains not less than nine (9) milligrams of phosphoric acid (P_2O_5), and requires not less than four (4) cubic centimeters of decinormal acid to neutralize its alkalinity.

4. *Sugar vinegar* is the product made by the alcoholic and subsequent acetous fermentations of solutions of sugar, sirup, molasses, or refiners' sirup, and contains one hundred (100) cubic centimeters (20° C.), not less than four (4) grams of acetic acid.

5. *Glucose vinegar* is the product made by the alcoholic and subsequent acetous fermentations of solutions of starch sugar or glucose, is dextro-rotatory, and contains, in one hundred (100) cubic centimeters (20° C.), not less than four (4) grams of acetic acid.

6. *Spirit vinegar, distilled vinegar, grain vinegar*, is the product made by the acetous fermentation of dilute distilled alcohol, and contains, in one hundred (100) cubic centimeters (20° C.), not less than four (4) grams of acetic acid.

III. SALT.

1. *Table salt, dairy salt*, is fine-grained crystalline salt containing on a water-free basis, not more than one and four-tenths (1.4) per cent of calcium sulphate ($CaSO_4$), nor more than five-tenths (0.5) per cent of calcium and magnesium chlorids ($CaCl_2$ and $MgCl_2$), nor more than one-tenth (0.1) per cent of matters insoluble in water.

Baking Powder.—Baking powders must not contain substances not necessary to their manufacture, and they must be labeled in a conspicuous way and place, either in the name of the powder itself or elsewhere, so as to show the acid salt of which the powder is made, as "Alum baking powder," "Alum-phosphate baking powder," "Phosphate baking powder," or "Cream of tartar baking powder," and when so labeled they must be true to label.

Labeling.—A label must be, as far as possible, attached to each package and contain, in addition to other information, the name and address of the manufacturer or jobber. When the words "artificial," "imitation," "compound," "adulterated," or words of similar import, are required, they must immediately precede or follow the word or words they modify, and be in the same size and style of type and on the same kind of background as the word or words with which they are closely associated.

Where the presence of preservatives or other substance or substances is required to be printed on the label, as indicated in the several paragraphs relating to different food products, the printing must be done clearly and conspicuously on the label in type not smaller than *brevier heavy gothic caps*, and on the same kind of background as the rest of the label.

FORM OF GUARANTY OF PURITY APPROVED BY THE BOARD OF AGRICULTURE, AS PROVIDED FOR IN SECTION SIX OF THE PURE-FOOD LAW.

I (or we), the undersigned wholesaler, jobber, or manufacturer, in consideration of (name and address), retail merchant, purchasing food from us, hereby guarantee that all food sold to..... shall be pure, within the meaning of what is known as the Pure-food Law (An Act to Prevent the Sale of Adulterated and Misbranded Food, ratified the 13th day of February, 1899), and shall conform with the requirements of said law and the Standards and Rulings of the Board of Agriculture as regards standards of quality, branding and otherwise. This guaranty to remain in force till revoked in writing.

The article referred to in this guaranty is (or are).....

Signed.....

Address.....

Date.....

GENERAL STATEMENT.

When of general interest, analyses will be made for parties within the State, if samples are taken in accordance with instructions furnished by the Department, and the required data concerning the samples are given.

Results of analyses are sent to parties sending samples and parties from whom samples are obtained by the Department, as well as the manufacturer of the products.

It is the desire of the Department to put information into the hands of manufacturers, dealers, and consumers of food, and to assist them in every way it can to know and manufacture, handle, and use the best, most desirable, and most wholesome food products. The Food Control is in the interest of the honest manufacturer, the honest dealer, and for the protection of the consumer.

SUMMARY OF RESULTS FOR COMPARISON.

For convenience of comparison of the work for the seven years, and to show at a glance the products which have been examined and the extent of adulteration of each, a summary of the results by year and by subject is given below:

SUMMARY OF WORK DONE BY YEAR.

1900.	No. of samples examined, 507; per cent adulteration found, 56.0
1901.	No. of samples examined, 308; per cent adulteration found, 35.7
1902.	No. of samples examined, 589; per cent adulteration found, 21.3
1903.	No. of samples examined, 477; per cent adulteration found, 32.1
1904.	No. of samples examined, 347; per cent adulteration found, 17.0
1905.	No. of samples examined, 317; per cent adulteration found, 42.2
1906.	No. of samples examined, 466; per cent adulteration found, 24.7

Total number of samples examined since the law went into effect (1900), 3,011.

Average per cent of adulteration found, 32.7.

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per cent Adulteration.</i>
Fruit Butter, Plum.....	1901	5	100.00
Fruit Butter, Apple.....	1903	1	100.00
Baking Powders	1901	85	18.80
Baking Powders	1902	12	
Baking Powders	1906	64	1.50
Beers—See Malts.			
Breakfast Foods	1900	24	4.11
Breakfast Foods	1903	20	
Breakfast Foods	1904	39	
Butter, Renovated Butter and Butterine.....	1900	11	
Butter, Renovated Butter and Butterine.....	1902	22	
Butter, Renovated Butter and Butterine.....	1904	15	
Butter, Renovated Butter and Butterine.....	1906	20	
Canned Fruit:			
Apples	1902	2	
Apricots	1902	6	17.00
Apricots	1904	1	
Blackberries	1902	2	
Blackberries	1904	1	
Cherries	1902	3	33.33
Peaches	1902	14	21.50
Peaches	1904	1	
Pears	1902	7	8.60
Pears	1904	2	
Pineapple	1902	3	
Pineapple	1904	3	
Plums	1904	2	
Canned Fish and Oysters.....	1904	53	1.88
Canned Meats.....	1904	33	39.39
Canned Vegetables:			
Asparagus	1904	3	
Beans, baked	1900	8	100.00
Beans, baked	1904	3	33.33
Beans, Lima	1900	8	62.50
Beans, Lima	1904	3	
Beans, Snap.....	1900	9	77.77
Beans, Snap.....	1904	3	

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per cent Adulteration.</i>
Beets	1904	3	
Celery	1900	2	
Corn	1900	70	60.00
Corn	1902	56	34.00
Corn	1904	16	43.75
Corn	1905	29	
Corn and Tomatoes.....	1900	4	100.00
Okra	1900	2	50.00
Okra and Tomatoes.....	1900	8	100.00
Okra and Tomatoes.....	1904	3	33.33
Peas, Garden.....	1900	37	81.00
Peas, Garden.....	1904	6	17.00
Pumpkin	1900	8	50.00
Succotash	1900	14	7.14
Tomatoes	1900	55	63.63
Tomatoes	1902	25	24.00
Tomatoes	1904	7	
Canned Soups	1906	26	
Catsups and Sances.....	1900	43	91.61
Catsups and Sauces.....	1902	22	100.00
Catsups and Sauces.....	1903	49	100.00
Carbonated Non-alcoholic Drinks, bottled.....	1900	33	72.72
Carbonated Non-alcoholic Drinks, bottled.....	1902	36	72.00
Carbonated Non-alcoholic Drinks, bottled.....	1903	20	25.00
Carbonated Non-alcoholic Drinks, bottled.....	1906	7	43.00
Ciders and Imitation Ciders.....	1900	3	100.00
Ciders and Imitation Ciders.....	1902	2	50.00
Ciders and Imitation Ciders.....	1903	1	100.00
Ciders and Imitation Ciders.....	1905	33	81.82
Cheese	1902	33	6.00
Cheese	1904	11	
Chocolate	1904	10	20.00
Cocoa	1904	14	
Coffee	1900	55	36.30
Coffee	1903	38	
Condiments	1901	44	20.40
Corn Meal	1902	17	
Corn Meal	1903	23	
Dried and Evaporated Fruit.....	1906	23	30.44
Fish and Oysters, fresh.....	1906	14	7.15

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per cent Adulteration.</i>
Flour	1900	37	
Flour	1902	70	1.40
Flour	1903	77	-
Flour	1904	59	
Grape Juice.....	1900	4	75.00
Grape Juice.....	1903	2	100.00
Honey	1901	5	20.00
Honey	1903	6	33.30
Honey	1906	3	
Jams	1901	9	100.00
Jams	1903	14	78.40
Jellies	1901	10	100.00
Jellies	1903	14	76.60
Lard	1900	11	9.00
Lard	1902	32	3.10
Lard, Compound	1902	24	
Malts, Beers, Ales, and Imitations.....	1900	30	80.00
Malts, Beers, Ales, and Imitations.....	1902	3	100.00
Malts, Beers, Ales, and Imitations.....	1903	14	86.00
Malts, Beers, Ales, and Imitations.....	1905	17	47.00
Malts, Beers, Ales, and Imitations.....	1906	91	31.68
Meats, fresh	1904	12	83.33
Meats and Sausage, fresh.....	1906	107	47.66
Molasses and Syrup.....	1901	32	81.20
Molasses and Syrup.....	1903	11	37.50
Maple Sugar	1905	2	50.00
Maple Syrup	1905	15	86.66
Marmalade	1903	3	
Olive Oil and other Table Oils.....	1900	11	18.18
Olive Oil and other Table Oils.....	1905	14	
Phosphates	1902	6	100.00
Phosphates	1903	3	
Phosphates	1905	2	
Prepared Mustard and Salad Dressings.....	1902	11	90.90
Prepared Mustard and Salad Dressings.....	1904	37	75.75
Prepared Mustard and Salad Dressings.....	1906	24	12.50
Preserves	1901	11	100.00
Preserves	1903	20	75.00
Sugar, White	1901	19	
Sugar, Brown	1903	16	
Sugar, White	1903	29	
Tea	1901	25	
Tea	1903	21	33.33

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per cent Adulteration.</i>
Tapioca	1903	3	
Tonics and Bitters.....	1900	1	100.00
Tonics and Bitters.....	1902	3	33.33
Tonics and Bitters.....	1903	1	33.33
Tonics and Bitters.....	1902	3	33.33
Tonics and Bitters.....	1903	3	33.33
Tonics and Bitters.....	1905	14	7.14
Tonics and Bitters.....	1906	13	
Vinegar	1900	22	59.00
Vinegar	1901	13	30.70
Vinegar	1903	62	29.00
Vinegar	1905	52	34.61
Vinegar	1906	21	47.62
Whiskies	1903	3	
Whiskies	1904	14	
Distilled Liquors.....	1906	28	
Wines	1903	5	100.00
Wines	1905	1	100.00
Wines	1906	5	

WORK OF THE YEAR 1906.

During the year 466 samples of foods and drinks, which were obtained from various towns of the State, have been analyzed. One hundred and fifteen, or 24.68 per cent, were found to be in some way sophisticated.

In the first report on food adulteration by the Department, which was published in 1900, 56 per cent of the samples examined were adulterated. The annual reports since that time show a gradual reduction in the per cent of adulteration found. That fact is very gratifying, for it shows that the exposure of adulteration tends to reduce or prevent it.

SUMMARY OF RESULTS OF THE EXAMINATION OF FOOD PRODUCTS
FOR 1906.

Name of Sample.	Total Number of Samples.	No Adulteration Found.	Adulterated.	Per Cent Adulteration.	Kind of Adulterant.
Baking powders -----	64	63	1	1.56	Tremolite.
Bitters and tonics -----	13	13	-----	-----	-----
Butter and renovated butter -----	20	20	-----	-----	-----
Canned soups -----	26	26	-----	-----	-----
Canned vegetables -----	23	17	6	26.1	Salicylic acid and copper.
Distilled liquors and wines -----	33	33	-----	-----	-----
Evaporated and dried fruit -----	23	16	7	30.44	Sulphites.
Fresh fish and oysters -----	14	13	1	7.15	Sulphites.
Fresh meats and sausage -----	107	56	51	47.66	Sulphites and salicylic acid.
Malts, beers, phosphates, ciders -----	91	59	32	31.68	Salicylic acid and coal-tar dye.
Non-alcoholic summer drinks -----	7	3	4	57.14	Salicylic acid and coal-tar dye.
Prepared mustard, salad dressing and pickles.	24	21	3	12.50	Sulphites and salicylic acid.
Vinegar -----	21	11	10	47.62	Water and spirit vinegar.
Total -----	466	351	115	24.68	-----

The methods of the Association of Official Agricultural Chemists were followed in the examination of the products presented in this report.

BAKING POWDERS.

The aeration or leavening of bread products, whether by yeast or baking powder, is accomplished by an evolution through the whole mass of dough of carbon dioxide gas, which in escaping makes the bread light and porous. Most of the gas is generated before the process of baking begins, but, to a large extent, is mechanically held in the mass, the heat causing the gas to expand and do its work more effectively.

Yeast introduces into the dough microscopic plants or ferments which produce alcohol and carbon dioxide gas, both of which largely escape during the baking, and the plant is killed by the heat.

Baking powder evolves carbon dioxide gas in the dough, by the chemical reaction of bicarbonate of soda with cream of tartar, acid phosphate, alum, or other chemicals, and leaves in the dough the non-volatile products of the reaction, consisting partly or wholly of mineral matter.

The same chemical action takes place when bicarbonate of soda is used in conjunction with cream of tartar or sour milk.

So far as the quality of the bread is concerned, there is no method that will approach the natural process. This means of leavening is at a slight loss of the bread, as the carbon dioxide gas, which does the work, comes from the decomposition of sugar and starch and, of course, to that extent, which is very small, lessens the value of the bread, but what is lost in quantity is gained in quality. The yeast, or natural process of leavening is slow and cannot be used when quick raising is desired.

CONSTITUENTS OF BAKING POWDERS.

Two ingredients are essential in a baking powder: a carbonate which contains the carbon dioxide gas, necessary to raising the dough, and an acid or its equivalent, which in the presence of moisture, liberates carbon dioxide from the carbonate. In addition to the essential constituents, most baking powders contain a filler, consisting of starch or flour, which is used simply to improve the keeping quality. Some other substances, such as sulphate of lime, argolite and tremolite are sometimes used as filler, but are considered highly undesirable additions to food products.

Sodium bicarbonate, also known as baking soda, is the principal carbonate, in fact, practically the only one, used in making powders.

There is more diversity in the acid constituents employed, the principal ones being tartaric acid, cream of tartar, acid phosphate of lime and the alums.

The residue, the character of which depends upon the acid furnishing material left in the bread, is the main objection to the use of baking powders, its amount and character determining, to a large extent, the healthfulness of the particular powder.

The efficiency of a baking powder as a leavening agent depends on the amount of gas it sets free in the dough, and must be considered apart from the wholesomeness of the residue it leaves.

CLASSIFICATION OF BAKING POWDERS.

Baking powders are classified according to the acid constituents they contain, as follows:

Tartrate Powders, in which the acid is tartaric acid in some form.

Phosphate Powders, in which the acid is phosphoric acid as an acid phosphate.

Alum Powders, in which the acid is sulphuric acid, contained in some form of an alum salt.

Alum-phosphate Powders, in which the acids are both sulphuric and phosphoric acid.

TARTARIC ACID BAKING POWDERS.

Tartaric acid is the principal acid in grapes, and is contained in all grape wines.

The residue left in bread prepared with tartaric acid powders is sodium tartrate.

CREAM OF TARTAR BAKING POWDERS.

Cream of tartar is the name by which bitartrate of potash or acid tartrate of potash is known in commerce.

The residue left in bread made with cream of tartar baking powders is sodium-potassium tartrate or Rochelle salts.

PHOSPHATE BAKING POWDERS.

The acid constituent of these powders is a purified acid phosphate of lime, sometimes called super-phosphate.

The residue left in bread by a phosphate powder is phosphate of lime, phosphate of soda and calcium sulphate, the latter being an impurity in the calcium phosphate used in making the powder.

ALUM BAKING POWDERS.

The acid material in an alum powder is some one of the class of salts known as alums, which are double sulphates of aluminium and an alkali. The acid in these is sulphuric acid and the carbon dioxide is set free from the bicarbonate of soda by the substitution of sulphuric acid for the carbonic acid, the aluminium being left as a hydroxide.

The residue left in bread from an alum powder is more complex than the residue from any of the other classes previously mentioned, and depends on the kind of alum used. Sodium sulphate and aluminium hydroxide are necessarily present, and if potash and ammonium alum are used their respective sulphates would be present also.

There is a class of powders that contain two, and sometimes even more, acid-furnishing materials; of these the alum-phosphate powders are the most important. They are mixtures of alum and phosphate powders, and the residue left in the bread by them would be a mixture of the residues already referred to under alum and phosphate powders, with a small amount of aluminium phosphate in addition.

All baking powders, without exception, leave in the bread certain salts, above mentioned, which are foreign to flour and objectionable, and most of which are used in medicine, though some of them not internally.

EXAMINATION OF SAMPLES.

Sixty-four samples, representing 30 different brands of baking powders offered for sale in North Carolina, have been analyzed recently.

The samples classified according to the acid material present are as follows:

	<i>Brands. Samples.</i>	
Tartrate Powders.....	6	9
Phosphate Powders.....	2	7
Alum Powders.....	17	43
Alum-Phosphate Powders.....	4	4
Alum-Phosphate-Tartrate Powders.....	1	1
Total.....	30	64

Only one sample was found to be adulterated, No. 4515. "Hermitage" contained 50.81 per cent of finely ground insoluble mineral matter.

A microscopic examination of this insoluble mineral matter by Mr. C. D. Harris showed it to be ground tale (tremolite). It appears under the microscope to be composed of sharp, needle-like crystals. It is a dangerous admixture in food products.

A sample of "Hermitage" baking powder was examined by this Department in 1902 and was found to contain 18.42 per cent of ground tale.

While under this examination only one sample was found adulterated, 38 samples were not properly labeled, the acid ingredient not being named, as is required. Of the 38 samples not properly labeled one was a tartrate powder and 37 were alum powders.

There is some prejudice in the minds of the public against the use of alum powders, and for that reason some manufacturers dislike to brand their products "alum powders."

In the analysis of these powders quantitative determinations were made of the carbon dioxide gas (the active leavening constituent to which powders owe their value) and the insoluble ash, though qualitative tests were made to ascertain the materials from which the powders were made, as well as any impurities or adulterants.

On standing, baking powders, unless put up practically air-tight, gradually lose their leavening power, and the longer a powder stands, other things being equal, the lower its leavening power will be. If a powder is not put up dry and kept so, there will be a gradual decomposition or loss in leavening power.

RESULTS OF THE EXAMINATION OF TARTARIC

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4508	Baking Powder, Royal---	Royal Baking Powder Co., New York.	Bruner & Huey, Monroe -----
4509	Baking Powder, Cream---	Price Baking Powder Co., New York.	Cooper & Gill, Statesville-----
3884	Baking Powder, Royal---	Royal Baking Powder Co., New York.	-----
4510	Baking Powder, Cream---	Price Baking Powder Co., New York.	-----
3765	Baking Powder, Royal---	Royal Baking Powder Co., New York.	Tucker & Erwin, Greensboro ----
3767	Baking Powder, Monarch	Reid, Murdock & Co., Chicago ---	D. J. Noland, Asheville-----
3768	Baking Powder, Golden Seal.	Pure Food Mfg. Co., Wilmington, N. C.	---do -----
3769	Baking Powder, Cleveland Superior.	Cleveland Baking Powder Co., New York.	---do -----
4511	Baking Powder, Hazard's High Test.	E. C. Hazzard & Co., New York	G. A. Greer, Asheville-----
4506	Baking Powder, Royal---	Royal Baking Powder Co., New York.	-----

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4512	Baking Powder, Victory-	E. C. Hazzard & Co., New York---	Asheville Grocery Co., Asheville --

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4513	Baking Powder, Rumford	Rumford Chemical Works, Providence, R. I.	Bruner & Huey, Monroe -----
3385	---do -----	---do -----	-----
4514	---do -----	---do -----	-----
3762	---do -----	---do -----	Tucker & Erwin, Greensboro-----
3763	---do -----	---do -----	D. G. Noland, Asheville -----
2269	Bread Preparation, Horsford's.	---do -----	W. D. Laroque, Jr., Kinston -----
3772	---do -----	---do -----	D. G. Noland, Asheville-----

ACID AND CREAM OF TARTAR BAKING POWDERS.

Laboratory Number.	Available Carbon Dioxide, Per Cent.	Ash—Insoluble in Hydrochloric Acid, Per Cent.	Filler.	Class.	Remarks.
4508	11.82	0.06	Starch -----	Cream of tartar baking powder.	Properly labeled.
4509	11.83	-----	do -----	do -----	do.
3884	12.28	0.07	do -----	do -----	do.
4510	11.86	0.05	do -----	do -----	do.
3765	10.96	0.08	do -----	do -----	do.
3767	10.23	0.13	do -----	do -----	do.
3768	10.43	0.19	do -----	do -----	do.
3769	9.71	0.08	do -----	do -----	do.
4511	13.65	0.03	None -----	do -----	do.
4506	12.21	-----	Starch -----	do -----	do.

TARTRATE-ALUM-PHOSPHATE BAKING POWDERS.

Laboratory Number.	Available Carbon Dioxide, Per Cent.	Ash—Insoluble in Hydrochloric Acid, Per Cent.	Filler.	Class.	Remarks.
4512	9.75	0.18	Starch -----	Tartrate-alum-phosphate -----	Not properly labeled. Kind of acid ingredient not indicated.

ACID PHOSPHATE BAKING POWDERS.

Laboratory Number.	Available Carbon Dioxide, Per Cent.	Ash—Insoluble in Hydrochloric Acid, Per Cent.	Filler.	Class.	Remarks.
4513	9.06	0.04	Starch -----	Acid Phosphate -----	Properly labeled.
3385	10.12	0.14	do -----	do -----	do.
4514	10.82	0.08	do -----	do -----	do.
3762	12.39	0.05	do -----	do -----	do.
3763	10.51	-----	do -----	do -----	do.
2269	9.52	0.21	do -----	do -----	do.
3772	13.49	0.08	do -----	do -----	do.

RESULTS OF THE EXAMINATION OF ALUM

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4516	Baking Powder, Blue Ribbon.	Blue Ribbon Baking Powder Co., Richmond, Va.	J. W. Haines & Co., High Point---
4515	Baking Powder, Hermitage.	Hermitage Baking Powder Co., Nashville, Tenn.	-----
4517	Baking Powder, Silver Star.	Canby, Ach & Canby, Dayton, Ohio	-----
2779	Baking Powder, Cracker Jack.	Virginia Chemical and Mfg. Co., Portsmouth, Va.	-----
4518	Baking Powder, Jersey--	For R. W. Warwick, Newton, N. C.	I. L. Warlick, Newton-----
2835	Baking Powder, Defiance	Virginia Chemical and Mfg. Co., Portsmouth, Va.	E. A. Hunt, Mocksville-----
3386	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond, Va.	-----
3388	do-----	do-----	-----
3389	Baking Powder, Parrot and Monkey.	Sea Gull Specialty Co., Baltimore, Md.	-----
3390	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond, Va.	-----
3391	Baking Powder, Parrot and Monkey.	Sea Gull Specialty Co., Baltimore, Md.	-----
3392	Baking Powder, Rex----	J. D. & R. S. Christian Co., Richmond, Va.	-----
3393	Baking Powder, Davis---	Wabash Baking Powder Co., Wabash, Ind.	L. G. Davis, Waynesville-----
3394	Baking Powder, Magnolia Pepsin.	Magnolia Mfg. Co., Petersburg, Va.	-----
3395	Baking Powder, Parrot and Monkey.	Sea Gull Specialty Co., Baltimore, Md.	-----
3397	Baking Powder, Faultless.	Heekin Spice Co., Cincinnati, Ohio	-----
3398	Baking Powder, Michaels	Wabash Baking Powder Co., Wabash, Ind.	-----
3291	Baking Powder, Davis' O. K.	R. B. Davis, Broadway, N. Y.	-----
3600	Baking Powder, Woodard's.	Wabash Baking Powder Co., Wabash, Ind.	Woodard & Woodard, Whitakers---
3758	Baking Powder, Parrot and Monkey.	Sea Gull Specialty Co., Baltimore.	D. G. Noland, Asheville-----
3759	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond, Va.	do-----
3766	Baking Powder, Eddy's Reliable.	Eddy & Eddy, St. Louis, Mo.	Bost & Newton, Hickory-----
3910	Baking Powder, Four Favorites.	Sea Gull Specialty Co., Baltimore.	Johnson Bros, Greenville-----
3913	Baking Powder, Commander.	Commander Specialty Co., Baltimore.	Williams-Little Grocery Co., Wilson.
3916	Baking Powder, Sweet Heart.	Southern Soda Works Co., Nashville, Tenn.	M. C. Broom, Monroe-----
3921	Baking Powder, Cracker Jack.	Virginia Chemical and Mfg. Co., Portsmouth, Va.	G. W. Jones, Lumberton-----
4048	Baking Powder, Snow King.	Kenton Baking Powder Co., Cincinnati.	J. S. Reeves, Waynesville-----
4049	Baking Powder, Faultless	Heekin Spice Co., Cincinnati	Warlick Grocery Co., Newton-----
4471	Baking Powder, Rex----	J. D. & R. S. Christian Co., Richmond, Va.	-----
4472	Baking Powder, Cracker Jack.	Virginia Chemical and Mfg. Co., Portsmouth, Va.	-----

AND ALUM PHOSPHATE BAKING POWDERS.

Laboratory Number.	Available Carbon Dioxide, Per Cent.	Ash—Insoluble in Hydrochloric Acid, Per Cent.	Filler.	Class.	Adulterants.	Remarks.
4516	7.35	0.54	Starch-----	Alum-----	-----	Not properly labeled, kind of acid not indicated.
4515	2.02	50.81	Finely ground mineral matter (Tremolite).	-----do-----	Finely ground mineral (Tremolite).	do.
4517	13.53	0.29	Starch-----	-----do-----	-----	do.
4518	13.10	0.36	-----do-----	-----do-----	-----	do.
2832	8.70	0.25	-----do-----	-----do-----	-----	-----
2835	15.72	0.38	-----do-----	-----do-----	-----	-----
3336	14.35	0.19	-----do-----	-----do-----	-----	Not properly labeled, kind of acid not indicated.
3388	10.86	-----	-----do-----	-----do-----	-----	do.
3389	10.05	0.17	-----do-----	-----do-----	-----	do.
3390	13.03	0.15	-----do-----	-----do-----	-----	do.
3391	13.11	0.13	-----do-----	-----do-----	-----	do.
3392	12.93	0.29	-----do-----	-----do-----	-----	do.
3393	12.20	0.28	-----do-----	Alum phosphate-----	-----	Contains only trace of phosphate of lime.
3394	7.31	0.07	-----do-----	Alum-----	-----	Not properly labeled, kind of acid not indicated.
3395	13.33	0.15	-----do-----	-----do-----	-----	do.
3397	9.98	0.36	-----do-----	Alum phosphate-----	-----	-----
3398	11.65	0.89	-----do-----	Alum-----	-----	Not properly labeled, kind of acid not indicated.
3291	12.98	0.25	-----do-----	Alum phosphate-----	-----	do.
3600	13.27	0.17	-----do-----	-----do-----	-----	Contains only trace of phosphate of lime.
3758	13.70	0.13	Starch-----	Alum-----	None-----	Not properly labeled, kind of acid not indicated.
3759	14.70	0.17	-----do-----	-----do-----	-----do-----	do.
3766	2.85	0.21	-----do-----	-----do-----	-----do-----	do.
3910	9.57	0.11	-----do-----	-----do-----	-----do-----	do.
3913	14.25	0.27	-----do-----	-----do-----	-----do-----	do.
3916	13.45	0.05	-----do-----	-----do-----	-----do-----	-----
3921	13.18	0.22	-----do-----	-----do-----	-----do-----	Not properly labeled, kind of acid not indicated.
4048	14.83	0.05	-----do-----	-----do-----	-----do-----	-----
4049	10.72	0.63	-----do-----	-----do-----	-----do-----	-----
4471	15.07	0.14	-----do-----	-----do-----	-----do-----	Not properly labeled, kind of acid not indicated.
4472	12.05	0.37	-----do-----	-----do-----	-----do-----	do.

RESULTS OF THE EXAMINATION OF ALUM AND

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4473	Baking Powder, Commander.	Commander Specialty Co., Baltimore.	-----
4474	Baking Powder, Devon	Atlantic Mfg. Co., Wilmington, N. C.	-----
4475	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond	-----
3911	Baking Powder, Parrot and Monkey.	Sea Gull Specialty Co., Baltimore.	People's Grocery Co., Lumberton
3755	-----do-----	-----do-----	Tucker & Erwin, Greensboro
3756	-----do-----	-----do-----	Theo. Atwell, Salisbury
3757	-----do-----	-----do-----	G. A. Greer, Asheville
3760	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond	Theo. Atwell, Salisbury
4495	Baking Powder, Com- mander.	Commander Specialty Co., Balti- more.	-----
4405	Baking Powder, Snow King.	Kenton Baking Powder Co., Cin- cinnati.	J. O. Loftin, West Raleigh
4496	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond, Va.	-----
4497	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond, Va.	-----
4498	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond, Va.	-----
4499	Baking Powder, Good Luck.	Southern Mfg. Co., Richmond, Va.	-----
4490	Baking Powder, Cascade	American Pure Food Co., St. Louis, Mo.	Ashboro Department Store, Ash- boro.
3915	Baking Powder, Blue Ribbon.	Blue Ribbon Baking Powder Co., Richmond, Va.	Williams-Little Grocery Co., Wil- son.

ALUM PHOSPHATE BAKING POWDERS—CONTINUED.

Laboratory Number.	Available Carbon Dioxide, Per Cent.	Ash—Insoluble in Hydrochloric Acid, Per Cent.	Filler.	Class.	Adulterants.	Remarks.
4473	13.88	0.18	Starch -----	Alum -----	None -----	Not properly labeled, kind of acid not indicated.
4474	8.33	0.23	do -----	do -----	do -----	do.
4475	14.23	0.18	do -----	do -----	do -----	do.
3911	14.51		do -----	do -----	do -----	do.
3755	12.02	0.07	do -----	do -----	do -----	do.
3756	10.10	0.08	do -----	do -----	do -----	do.
3757	11.11		do -----	do -----	do -----	do.
3760	11.21		do -----	do -----	do -----	do.
4495	12.02		do -----	do -----	do -----	do.
4405	16.55	0.37	do -----	do -----	do -----	do.
4496	12.03		do -----	do -----	do -----	Not properly labeled, kind of acid not indicated.
4497	14.80		do -----	do -----	do -----	do.
4498	14.08		do -----	do -----	do -----	do.
4499	14.36		do -----	do -----	do -----	do.
4490	11.43		do -----	do -----	do -----	do.
3915	7.88		do -----	do -----	do -----	do.

BUTTER AND RENOVATED BUTTER.

"Butter is the clean, non-rancid product made by gathering, in any manner, the fat of fresh or ripened milk or cream into a mass, which also contains a small portion of the other milk constituents, with or without salt, and contains no less than 82.50 per cent of milk fat. It may also contain added coloring matter," provided the coloring matter is not of coal-tar origin, which is prohibited in all food materials.

"Renovated butter, process butter, is the product made by melting butter and reworking, without the addition or use of chemicals or any substances except milk, cream, or salt, and contains not more than 16 per cent water and at least 82.50 per cent of milk fat."

SAMPLES EXAMINED.

Under this head 20 samples were examined, 14 of which proved to be butter and 6 renovated butter. Three samples, 4365, 4460 and

RESULTS OF THE EXAMINATION OF BUTTER AND

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4442	Butter—Four Leaf Clover	Continental Creamery Co., Topeka, Kans.	George S. Terrell, Raleigh, N. C.
4443	Butter—Gold Medal-----	Ammon & Person, Jersey City, N. J.	J. B. Green & Co., Raleigh, N. C.
4444	Butter—Country-----	-----do-----	-----do-----
4445	Butter—Guernsey-----	Clover Dale Dairy, Raleigh-----	-----do-----
4446	Butter—Peerless-----	-----do-----	W. B. Mann, Raleigh, N. C.-----
4447	Renovated Butter-----	Scott & Co., Norfolk, Va.-----	Robbins Cash Grocery, Raleigh, N. C.
4448	----do-----	----do-----	W. R. Dorsett, Raleigh, N. C.-----
4449	Renovated Butter—Park's Dale.	Continental Creamery Co., Topeka, Kans.	Rogers Grocery Co., Raleigh, N. C.
4365	Butter—Country-----	D. H. Pugh, Raleigh, N. C.-----	Jasper McRary, Raleigh, N. C.---
4364	Butter—Meadow Gold*----	Continental Creamery Co., Topeka, Kans.	D. M. Beale, Potecasi, N. C.-----
4450	Butter—Country-----	Mrs. D. Rudy, Raleigh, N. C.-----	J. E. Rudy & Co., Raleigh, N. C.
4454	----do-----	Agricultural and Mechanical College, Raleigh, N. C.	-----do-----
4460	----do*-----	D. H. Pugh, Raleigh, N. C.-----	-----do-----
4205	Butter—Meadow Gold*----	Continental Creamery Co., Topeka, Kans.	-----do-----
4491	Butter—Country*-----	-----do-----	Mrs. E. A. Howard, Raleigh, N. C.
4492	----do*-----	D. H. Pugh, Raleigh, N. C.-----	-----do-----
3839	Butter-----	-----do-----	Holmes Grocery Co., Wilmington, N. C.
3840	Renovated Butter—Gold Medal.	Ammon & Person, Jersey City, N. J.	-----do-----
3841	----do-----	----do-----	Peter Moore, Wilmington, N. C.--
3942	----do-----	----do-----	Bryant Jones, Wilmington, N. C.

* Sent to the Department by local dealers and others for analysis.

4492, all from the same cow, with about 8 weeks intervening between the making of the first and last samples, were examined.

The melting point, the volatile fatty acid of these samples and the reading of the refractometer on them, indicated an abnormal butter, and they were at first thought probably to be adulterated, but on investigation it was learned that the cow from which it had been made had been fed on a ration largely cotton seed, which explained the results.

All the six samples of the renovated butter were properly labeled, but No. 3841 was retailed from a tub, and was sold by the retail dealer for butter. The retailers often speak of renovated butter as "tub butter" or "cooking butter." There can be little doubt that it is often bought and eaten without the purchaser or consumer knowing that it is the renovated article. However, it is a violation of the Food Law to offer it for sale as butter.

All the samples examined come within the standards, and no adulteration was found.

RENOVATED BUTTER—NO ADULTERATION FOUND.

Laboratory Number.	Volatile Fatty Acid.	Reading Refractometer at 45°C.	Refractive Index.	Preservative.	Coloring Matter.	Remarks.
4442	29.15	41.5	----	None found.	None found.	Butter.
4443	32.09	41.0	----	do	do	do.
4444	29.77	39.5	----	do	do	do.
4445	31.04	40.0	----	do	do	do.
4446	30.57	41.5	----	do	do	do.
4447	31.36	40.5	----	do	do	Renovated Butter.
4448	30.93	40.5	----	do	do	do.
4449	33.49	40.5	----	do	do	do.
4365	20.52	41.2	----	do	do	Butter, poor quality; cow fed on too much cotton-seed products.
4364	31.40	40.3	----	do	do	Butter.
4450	32.57	39.8	----	do	do	do.
4454	30.93	40.5	----	do	do	do.
4460	20.45	42.0	----	do	do	Butter, poor quality; cow fed on too much cotton-seed products.
4205	31.60	39.8	----	do	do	Butter.
4491	31.11	39.5	----	do	do	do.
4492	19.98	42.0	----	do	do	Butter, poor quality; cow fed on too much cotton-seed products.
3839	30.93	39.5	----	do	do	Butter.
3840	31.45	40.5	----	do	do	Renovated Butter.
3841	31.25	40.9	----	do	do	Sold for Butter.
3942	32.20	40.3	----	do	do	Renovated Butter.

FRESH MEATS.

(MEAT, SAUSAGE, OYSTERS, AND FISH).

*Meat is any clean, sound, dressed, and properly prepared edible part of animals in good health at the time of slaughter, and if it bears a name descriptive of its kind, composition, or origin, it corresponds thereto. The term 'animals' herein used, includes not only mammals, but fish, fowl, crustaceans, mollusks, and all other animals used as food.

"Fresh meat is meat from animals recently slaughtered and properly cooled until delivered to the consumer.

"Cold-storage meat is meat from animals recently slaughtered and preserved by refrigeration."

Meat is deemed adulterated if treated with any of the substances declared deleterious and dangerous to health by the State Food Law, or with any antiseptic or chemical preservative or dye-stuff whatsoever, whose use and purpose is to retard, prevent, or mask decomposition. In addition to the above, sausage shall be deemed adulterated if it is composed in any part of liver, lungs, kidneys, or other viscera of animals: *Provided*, that the use of animal intestines as sausage casings shall not be deemed an adulteration.

The principal adulteration in fresh meats is the use of chemical preservatives on them. These preservatives are the principal constituents of preparations which are sold to meat men under various trade names, as Liebig's Conserver, Preservaline, Freezine, Freez-Em, Froze-Em, Frostine, Refrigerine, and many others. These preparations are usually guaranteed to be harmless, but the guaranty is of course worthless.

Most of these preservatives are drugs, which, when used as medicines, have to be given with care. Their use in foods, to say the least, is exceedingly questionable, and, as in nearly all cases, their use is unnecessary; they should not be employed. Their use in foods offered for sale in North Carolina is in violation of the State Food Law.

A great deal of the fresh meat and sausage is prepared and sold by butchers and other meat men, who, when they use the chemical preservatives, know not what they are dispensing to their customers.

SAMPLES EXAMINED.

Under the head of fresh meats, exclusive of fish and oysters, though including sausage, 108 samples, collected from the various towns of the State were examined. Fifty-six, or about 52 per cent

* Extracts from standards published elsewhere in this report.

of them, were found adulterated, containing either boric acid or sulphites, and many had both. Two of the samples contained boric acid and salicylic acid. It is but just to say that most of the adulteration was in the sausage, though some was found in the other meats as well.

FISH AND OYSTERS.

Under the head of meats, according to the standards, come fish and oysters, of which 14 samples were examined. In the samples of oysters, 13 in number, no adulteration was found, but the one sample of fish contained sulphites.

RESULTS OF THE EXAMINATION OF FRESH MEATS AND SAUSAGE--NO ADULTERATION FOUND.

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Adulterants (Chemical Preservatives).
4154	Kidneys and Liver.	-----	J. Schwartz, Raleigh, N. C.	None found.
4155	Beefsteak	-----	do	do.
4156	Sausage	-----	Chas. Chavis, Raleigh, N. C.	do.
4158	Beef Tripe	Swift & Co., Richmond, Va.	L. M. Waring, Raleigh, N. C.	do.
4160	Souse Meat	do	do	do.
4162	Beef Chops	-----	Thos. Burgess, Raleigh, N. C.	do.
4164	Ham, Cured	Kingan & Co., Richmond, Va.	E. G. Richardson, Raleigh, N. C.	do.
4165	Sausage	-----	W. R. Crawford, Raleigh, N. C.	do.
4166	Pig Feet	Swift & Co., Richmond, Va.	do	do.
4168	Beefsteak	-----	Young & Jones, Raleigh, N. C.	do.
4170	Ham, Cured	Armour & Co., Richmond, Va.	Thos. Donaldson, Raleigh, N. C.	do.
4171	Souse Meat	do	do	do.
4173	Brains	Kingan & Co., Richmond, Va.	Robbins Cash Grocery, Raleigh, N. C.	do.
4176	Pork	do	do	do.
4493	do *	-----	G. S. Terrell, Raleigh, N. C.	do.
4261	Sausage	-----	D. M. Morgan, Smithfield, N. C.	do.
4262	Beefsteak	-----	do	do.
4263	Sausage	-----	F. H. Parish, Smithfield, N. C.	do.
4264	Beefsteak	-----	do	do.
4265	Sausage, Stuffed	-----	S. Cohen & Son, Goldsboro, N. C.	do.
4266	Pork	-----	do	do.
4267	Beef	-----	do	do.
4271	do	-----	Allen Braxton, Kinston, N. C.	do.
4273	do	-----	do	do.
4274	Sausage	-----	Barnes' Market, Kinston, N. C.	do.
4276	Beef	-----	do	do.

*Sent to the Department by local dealers and others for analysis.

RESULTS OF THE EXAMINATION OF FRESH MEATS AND SAUSAGE—NO
ADULTERATION FOUND—CONTINUED.

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Adulterants (Chemical Preservatives).
4277	Beefsteak -----	Kingan & Co., Richmond, Va.	Skinner & Co., Kinston, N. C.	None found.
4278	Sausage, Pork -----	do -----	Henry Gray, Kinston, N. C.	do.
4280	Beef -----	do -----	B. Swert, New Bern, N. C.	do.
4283	Lamb Chop -----	do -----	Oaks' Meat Market, New Bern, N. C.	do.
4284	Pork Chop -----	do -----	do -----	do.
4285	Pork -----	do -----	do -----	do.
4289	Hog Jowl -----	G. M. Lamb & Co., Baltimore, Md.	Coast Line Meat Market, New Bern, N. C.	do.
4295	Beefsteak -----	Kingan & Co., Richmond, Va.	do -----	do.
4296	Tongue -----	do -----	do -----	do.
4305	Loin, Pork -----	Swift & Co., Chicago, Ill.	Elite Market, Wilmington, N. C.	do.
4306	Mutton Chops -----	Armour Packing Co., Chicago, Ill.	do -----	do.
4309	Beef, Corned -----	do -----	Parlor Meat Market, Wilming- ton, N. C.	do.
4310	Fresh Beef Liver	Swift & Co., Chicago, Ill.	Parlor Meat Market, Wilming- ton, N. C.	do.
4312	Beef -----	do -----	I. B. Rhodes, Wilmington, N. C.	do.
4313	Sausage, Pork -----	do -----	do -----	do.
4314	Beef -----	do -----	Jas. Reynolds, Fayetteville, N. C.	do.
4315	Sausage, Mixed -----	do -----	N. A. Van, Fayetteville, N. C.	do.
4316	do -----	do -----	O. Rumley, Washington, N. C.	do.
4317	do -----	do -----	H. R. Bright, Washington, N. C.	do.
4318	Beef -----	Kingan & Co., Richmond, Va.	A. A. Nichols, Washington, N. C.	do.
4319	Souse Meat -----	do -----	do -----	do.
4331	Sausage, Mixed -----	do -----	Hoder & Chrissman, Lexing- ton, N. C.	do.
4333	do -----	do -----	M. L. Jackson, Salisbury, N. C.	do.
4340	Sausage -----	do -----	S. Britton, Murphy, N. C.	do.

RESULTS OF THE EXAMINATION OF FRESH MEATS AND SAUSAGE—
ADULTERATED.

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Adulterants (Chemical Preservatives).
4153 Sausage -----		Kingan & Co., Richmond, Va.	D. T. Johnson, Raleigh, N. C.	Boric Acid.
4157 Beef Chops -----			Wm. Dancy, Raleigh, N. C.	do.
4159 Sausage -----			L. M. Waring, Raleigh, N. C.	do.
4161 ----do-----			Wash Shepherd, Raleigh, N. C.	do.
4163 Beef Tripe -----		Swift & Co., Richmond, Va.	E. G. Richardson, Raleigh, N. C.	do.
4167 Ham, Fresh -----		Kingan & Co., Richmond, Va.	W. R. Crawford, Raleigh, N. C.	do.
4169 Sausage -----			Thomas Donaldson, Raleigh, N. C.	do.
4172 Sausage, Cured-----		Kingan & Co., Richmond, Va.	do	do.
4174 Sausage -----			Robbins Cash Grocery, Raleigh, N. C.	do.
4175 Hoghead Cheese -----		Armour & Co., Richmond, Va.	do	do.
4206 Sausage -----			Thomas Donaldson, Raleigh, N. C.	Boric Acid and Sulphites.
4268 Sausage, Mixed -----			M. Sherman, Goldsboro, N. C.	do.
4270 Sausage -----			do	Boric Acid.
4272 ----do-----			Allen Braxton, Kinston, N. C.	do.
4275 Sausage, Pork -----			Barnes' Market, Kinston, N. C.	Boric Acid and Sulphites.
4279 Sausage, Mixed -----			B. Swert, New Bern, N. C.	Boric Acid.
4281 Sausage -----			Oaks' Meat Market, New Bern, N. C.	do.
4282 Sausage, Country Smoked -----			do	do.
4286 Pig Feet, Pickled*-----		Armour Packing Co., Chicago, Ill.	do	do.
4288 Ham, Boneless -----		Swift & Co., Wilmington, N. C.	Oaks' Meat Market, New Bern.	Boric Acid.
4290 Sausage, Mixed -----			Coast Line Meat Market, New Bern.	Boric Acid—Sulphites.
4291 Beef -----			do	Boric Acid.
4292 Sausage, Bologna -----		Cudahy Packing Co., Omaha, Neb.	do	do.
4293 Ham, Rex -----		do	do	do.
4294 Ham -----		G. M. Lamb, Baltimore, Md.	do	do.
4297 Sausage, Pork -----		Armour Packing Co., Chicago, Ill.	Elite Market, Wilmington, N. C.	do.
4298 Sausage -----		Swift & Co., Chicago, Ill.	do	do.
4299 Pig Feet, Pickled-----		Armour Packing Co., Chicago, Ill.	do	do.
4300 Bologna Sausage -----		do	do	do.
4301 Sausage, Dried -----		do	do	do.
4302 ----do-----		do	do	Sulphites.
4303 Tripe, Regular, Fresh -----		Swift & Co., Chicago, Ill.	do	Boric Acid.
4304 Pig Feet Jelly, Pressed -----		do	do	do.
4307 Sausage -----		Armour Packing Co., Chicago, Ill.	Parlor Meat Market, Wilmington, N. C.	do.
4308 Sausage, Dried -----		do	do	do.
4311 Sausage, Mixed -----			I. B. Rhodes, Wilmington, N. C.	do.

RESULTS OF THE EXAMINATION OF FRESH MEATS AND SAUSAGE—
ADULTERATED—CONTINUED.

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Adulterants (Chemical Preservatives).
4320	Sausage, Mixed		J. W. Hutchings, Dur- ham, N. C.	Sulphites.
4321	do		A. A. Thacker, Durham, N. C.	do.
4322	Sausage, Pork		Mincey & Talley, Dur- ham, N. C.	Boric Acid.
4323	Sausage, Link		W. E. Holt, Durham, N. C.	do.
4324	Sausage, Mixed		C. M. Herndon, Durham, N. C.	do.
4325	do		W. T. Sheppard, Dur- ham, N. C.	Sulphites.
4326	do		R. W. Gray, High Point, N. C.	Sulphites and Boric Acid.
4327	Sausage, Pork		do	do.
4328	Fish, Fresh		do	Sulphites.
4329	Sausage, Mixed		Henderson & Ingram, High Point, N. C.	do.
4320	do		McIntyre & Son, High Point, N. C.	Boric Acid.
4332	do		Rusher & Brown, Spen- cer, N. C.	Boric Acid and Salicylic Acid.
4334	do		Hoffman Market, Salis- bury, N. C.	do.
4335	do		W. F. Bennett, Char- lotte, N. C.	Sulphites.
4336	Sausage, Vienna		J. C. Weber, Charlotte, N. C.	Boric Acid and Sul- phites, large amts.
4337	Sausage, Mixed		Henry Hayman, Char- lotte, N. C.	Sulphites, very large amounts.
4338	do		J. D. Pope, Hickory, N. C.	Boric Acid and Sul- phites, large amts.
4341	do		Kubler & Whitehead, Asheville, N. C.	Sulphites.
4342	do		Star Market, Asheville, N. C.	do.
4343	do		Sultz Meat Co., Ashe- ville, N. C.	do.

RESULTS OF THE EXAMINATION OF FRESH FISH AND OYSTERS.

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Adulterants (Preserva- tives).
4179	Oysters -----	J. C. Wainwright & Son, Portsmouth, Va.	C. D. Arthur, Raleigh, N. C. --	None found.
4180	---do -----	J. W. Marshall, West Point, Va.	C. E. Nevels, Raleigh, N. C. --	do.
4181	---do -----	F. H. Ayres, Portsmouth, Va.	Britton Pearce, Raleigh, N. C. --	do.
4182	---do -----	J. W. Marshall, West Point, Va.	---do -----	do.
4183	---do -----	D. B. Waid & Son, Morehead City, N. C.	---do -----	do.
4184	---do -----	Isaac Fass, Portsmouth, Va. --	Joe Mills, Raleigh, N. C. -----	do.
4185	---do -----	---do -----	L. M. Waring, Raleigh, N. C. --	do.
4186	---do -----	William E. Muir, Belhaven, N. C.	W. D. King, Raleigh, N. C. --	do.
4187	---do -----	J. M. Arthur, Morehead City, N. C.	Robbins Cash Grocery, Raleigh, N. C.	do.
4188	---do -----	J. W. Marshall, West Point, Va.	---do -----	do.
4189	---do -----	Hemingway Packing Co., Norfolk, Va.	---do -----	do.
4190	---do -----	W. N. McAuge & Co., Suffolk, Va.	G. S. Terrell, Raleigh, N. C. --	do.
4191	---do -----	---do -----	N. Rosenthal & Co., Raleigh, N. C.	do.
4328	Fresh Fish -----	-----	R. W. Gray, High Point, N. C.	Sulphites.

CANNED SOUPS.

As there is no standard for this class of goods, other than that they, like all others, shall not contain chemical preservatives or coal-tar

RESULTS OF EXAMINATIONS OF CANNED

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
2867	Tomato Soup, Libby's Premier-----	Libby, McNeil & Libby, Chicago, Ill.-----
3977	Tomato Soup, French -----	Franco-American Food Co., Jersey City Heights, N. J.
3980	Tomato Soup, Van Camp's-----	The Van Camp Packing Co., Indianapolis, Ind.
3981	Tomato Soup, Nahob-----	Francis H. Leggett & Co., New York-----
3982	Tomato Okra Soup, Schimil's -----	American Preserving Co., Philadelphia, Pa. --
3737	Bouillon, Van Camp's -----	The Van Camp Packing Co., Indianapolis, Ind.
3739	Tomato Soup, Van Camp's-----	do -----
3740	Tomato Soup, Libby's -----	Libby, McNeil & Libby, Chicago, Ill.-----
3741	Soup Bouillon, Campbell's -----	Jos. Campbell Preserve Co., Camden, N. J. ---
3742	Soup, Consomme, Blue Label -----	Curtice Bros. Co., Rochester, N. Y. -----
4419	Soup, Chicken, Van Camp's -----	The Van Camp Packing Co., Indianapolis, Ind.
4025	Soup, Tomato, Van Camp's -----	do -----
4421	Soup, Julienne, Campbell's -----	Jos. Campbell Preserve Co., Camden, N. J. ---
4422	Soup, Mutton, Campbell's-----	do -----
4423	Soup, Vermicelli and Tomato, Campbell's -----	do -----
4424	Soup, Tomato Okra, Campbell's -----	do -----
4425	Soup, Ox Tail, Campbell's-----	do -----
4426	Soup, Pea, Campbell's-----	do -----
4427	Soup, Bouillon, Campbell's-----	do -----
4428	Soup, Mock Turtle, Campbell's-----	do -----
4429	Soup, Chicken, Campbell's -----	do -----
4430	Soup, Beef Pea, Seal Brand-----	J. Ritter Conserve Co., Philadelphia, Pa.-----
4431	Soup, Chicken, French-----	Franco-American Food Co., Jersey City Heights, N. J.
4432	Soup, Tomato, Heinz-----	H. J. Heinz, Pittsburg, Pa. -----
4433	Soup, Tomato, Heinz-----	do -----
4420	Soup, Pepper Hot, Campbell's -----	Jos. Campbell Preserve Co., Camden, N. J. ---

dyes, the samples examined under this head were tested for preservatives and coal-tar dyes only.

Twenty-six samples were examined, but no adulteration was found.

SOUPS—NO ADULTERATION FOUND.

Laboratory Number.	Retail Dealer.	Adulterants.	
		Preservatives.	Objectionable Coloring Matter.
2867	Rose & Wilson, Winston -----	None found -----	None found.
3977	-----	do -----	do.
3980	Williams-Little Grocery Co., Wilson -----	do -----	do.
3981	H. C. Hardison Co., Wadesboro -----	do -----	do.
3982	Bridges & Co., Charlotte, N. C. -----	do -----	do.
3737	Theo. Atwell, Salisbury, N. C. -----	do -----	do.
3739	G. A. Greer, Asheville, N. C. -----	do -----	do.
3740	Bost & Newton, Hickory, N. C. -----	do -----	do.
3741	-----	do -----	do.
3742	G. A. Greer, Asheville, N. C. -----	do -----	do.
4419	Tucker and Erwin, Greensboro, N. C. -----	do -----	do.
4025	Bruner & Huey, Monroe, N. C. -----	do -----	do.
4421	Tucker & Erwin, Greensboro, N. C. -----	do -----	do.
4422	do -----	do -----	do.
4423	Theo. Atwell, Salisbury, N. C. -----	do -----	do.
4424	do -----	do -----	do.
4425	do -----	do -----	do.
4426	do -----	do -----	do.
4427	do -----	do -----	do.
4428	do -----	do -----	do.
4429	do -----	do -----	do.
4430	do -----	do -----	do.
4431	W. M. Harris, Salisbury, N. C. -----	do -----	do.
4432	do -----	do -----	do.
4433	do -----	do -----	do.
4420	Tucker & Erwin, Greensboro, N. C. -----	do -----	do.

CANNED VEGETABLES.

The subject of canning vegetables and the adulteration of the same was discussed in the Food Report of this Department, published December, 1900. Only the important points will, therefore, be mentioned here.

The advantages to be gained in canning vegetables are well known to all.

The process of canning consists, in brief, in cleaning and otherwise preparing the vegetables, placing them in the cans, heating at high enough temperature and long enough to kill all the fermentative germs in the articles. The vessel is then sealed to prevent the admission, from the air, of other organisms which would produce decay. If a tightly sealed can of vegetables spoils, it shows that all the organisms of decay were not killed by the heating in the canning process.

RESULTS OF EXAMINATIONS OF CANNED

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4488	Pork and Beans, The Best -----	Libby, McNeil and Libby, Chicago, Ill. -----
2879	Baked Beans, Heinz-----	H. J. Heinz Co., Pittsburg -----
2267	----do -----	----do -----
2853	Sauer-kraut, Libby's -----	Libby, McNeil & Libby, Chicago, Ill. -----
3792	String Beans, Melrose-----	Githens-Rexsamer & Co., Philadelphia, Pa.---
3794	Red Kidney Beans, Victor -----	----do -----
3804	Early June Peas, Sunbeam-----	Austin, Nichols & Co., New York, N. Y.-----
3805	----do -----	----do -----
3806	Early June Peas, Honey Bee-----	Aughinbaugh Canning Co., Baltimore, Md.---
3807	Early June Peas, Duchess-----	Darn, Davis & Co., Ellicot City, Md.-----
3808	Petite Pois -----	Sears & Nichols, Pentwater, Mich.-----
3811	Sweet Peas, Our Winner-----	Chautauqua Preserving Co., Irving, N. Y. ----
3812	Lima Beans, First Quality -----	Githens-Rexsamer & Co., Philadelphia, Pa. -
3813	String Beans, Case & Jones -----	Case & Jones, Dana, N. C. -----
3987	Hominy, Van Camp's -----	Van Camp Packing Co., Indianapolis, Ind.----
3988	----do -----	----do -----
2881	Pork and Beans, Libby's -----	Libby, McNeill & Libby, Chicago, Ill. -----

If the heating process is too long and the temperature too high, it tends to break down the connective tissues and destroy the natural color, all of which tends to render the vegetables less attractive in appearance. To shorten the heating process in canning and to guard against the possibility of not having killed all of the organisms of decay, chemical preservatives are sometimes used in canned vegetables. If the natural color of the vegetables is destroyed, copper and zinc salts are sometimes used to restore it.

These preservatives and coloring matters being considered objectionable in food materials, it was for their presence that these samples were examined.

Only 21 samples of this class were tested, 4 of which contained salicylic acid and 2 copper salts. Those containing copper salts were both French packed.

VEGETABLES—NO ADULTERATION FOUND.

Laboratory Number.	Retail Dealer.	Adulterants.	
		Preservatives.	Objectionable Coloring Matter.
4488	J. L. Starkey & Bro., Greenville, N. C. -----	None found -----	None found.
2879	Cooper & Gill, Winston, N. C. -----	do -----	do.
2267	W. D. Larque, Jr., Kinston, N. C. -----	do -----	do.
2853	Bruner & Huey, Monroe, N. C. -----	do -----	do.
3792	D. G. Noland, Asheville, N. C. -----	do -----	do.
3794	do -----	do -----	do.
3804	do -----	do -----	do.
3805	do -----	do -----	do.
3806	do -----	do -----	do.
3807	Theo. Atwell, Salisbury, N. C. -----	do -----	do.
3808	D. G. Noland, Asheville, N. C. -----	do -----	do.
3811	Tucker & Erwin, Greensboro, N. C. -----	do -----	do.
3812	D. G. Noland, Greensboro, N. C. -----	do -----	do.
3813	do -----	do -----	do.
3987	W. L. Williams, Rockingham, N. C. -----	do -----	do.
3988	K. W. Ashcraft, Wadesboro, N. C. -----	do -----	do.
2881	Rose & Wilson, Winston, N. C. -----	do -----	do.

RESULTS OF EXAMINATIONS OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
2880	Pork and Beans, Star-----	Armour Canning Co., Chicago, Ill.	Rose & Wilson, Winston, N. C.--
2913	Baked Beans, Roxbury ----	Roxbury Packing Co., Boston, Mass.	J. M. Smith, Rockingham, N. C.
2917	Baked Beans, Mayflower-----	-----	J. A. Newberry, Rockingham, N. C.
4489	Lima Beans, Puritan ----	Hollowell Packing Co., Brunswick, Me.	D. G. Noland, Asheville, N. C.--
3809	Peas, French -----	Eugene Du Raix, Bordeaux, France	do -----
3810	String Beans -----	do -----	do -----

PREPARED MUSTARD, SALAD DRESSING, AND PICKLES.

*“Prepared mustard, German mustard, French mustard, mustard paste, is a paste composed of a mixture of ground mustard seed or mustard flour, with salt, spices and vinegar, and calculated free from water, fat and salt; contains not more than 24 per cent of carbohydrates, calculated as starch, not more than 12 per cent of crude fiber nor less than 35 per cent of protein, derived solely from the materials named. Salad dressing contains some table oil also.”

The common adulterants of prepared mustard are make-weights, starchy materials in excess (wheat and corn flour, etc.), coloring matters, such as turmeric and coal-tar dyes (Martius' Yellow, etc.), and chemical preservatives, such as sulphites, salicylic acid, etc.

The most objectionable form of adulteration in this class of goods is the unscrupulous use of make-weights and artificial coloring matter to hide them, turmeric, probably, being most largely used for the coloring because of its flavor, as the manufacturers can claim that as the purpose of its use. It has a bright yellow color and is prepared from a plant allied to ginger. It is not poisonous, and its use is objectionable only on account of its deception. It is used to cover up adulteration and inferior materials, particularly flour, when used excessively. As the consumer cannot distinguish between turmeric and some of the poisonous coal-tar colors, its use is dangerous, for the unscrupulous manufacturer can use the cheaper poisonous dyes instead.

*Extracts from standards published elsewhere in this report.

CANNED VEGETABLES.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Objectionable Coloring Matter.	
2880	Salicylic Acid -----	None found -----	This brand has been discontinued by manufacturers.
2913	do -----	do -----	
2917	do -----	do -----	Not properly labeled.
4489	-----	do -----	
3809	-----	Copper -----	
3810	-----	do -----	

SAMPLES EXAMINED AND DISCUSSION OF RESULTS.

By reference to the following tables it will be seen that 24 samples were examined, 3 of which were adulterated with chemical preservatives. Eight of the samples contained starch, some of which in rather large quantities, but as the quantity was not determined, it could not be classed as an adulterant. By oversight the samples were not tested for turmeric, though they were tested for coal-tar dyes, but none were found.

The labels of several samples contained formulæ similar to the following:

Mustard seed	15.	per cent.
Vinegar	75.	per cent.
Salt	7.	per cent.
Herbs	1.75	per cent.
Spices	1.00	per cent.
Turmeric	0.25	per cent.

100.

If starch was mentioned at all in any formula, it was represented as a trace, and the manufacturer attributed it to the herbs, which, of course, have a small amount in their composition, but not, by far, so much as was found in some of the samples.

A small amount of starch might be present from the use of unripe seeds, but it would be a small amount only. The ripe seeds do not contain starch.

RESULTS OF THE EXAMINATION OF PREPARED MUSTARDS,

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
3624	Prepared Mustard, Heinz--	H. J. Heinz Co., Pittsburg, Pa.----	Clarence Sawyer, Asheville, N.C.
3627	Horseradish and Mustard, Lippincott's.	Lippincott & Cree Co., Cincinnati, Ohio.	W. M. Harris & Co., Salisbury, N. C.
3665	Celery Salad, Dunklee's----	Dunklee Celery Co., Kalamazoo, Mich.	Theo. Atwell, Salisbury, N. C. --
3721	Chopped Pickles, Waldorf Relish.	Williams Bros. Co., Detroit, Mich.	Tucker & Erwin, Greensboro, N. C.
3722	Hot Pickles, Monogram----	Knadler & Lucas, Louisville, Ky.---	Theo. Atwell, Salisbury, N. C. --
3872	Pickles, Sweet, Our Pride----	Gasts-Crofts Co., Louisville, Ky.---	Caldwell & Carlyle, Lumberton, N. C.
3375	Chow-Chow, Picnic-----	Flaccus Bros., Richmond, Va.-----	W. T. Williams, Rockingham, N. C.
3381	Prepared Mustard, Celery-tone.	Dunklee Co., Kalamazoo, Mich.---	S. H. Youngblood, Charlotte, N. C.
3882	Prepared Mustard, Richelieu.	Sprague, Warner Co., Chicago, Ill.---	-----do-----
3384	Prepared Mustard, Heinz--	H. J. Heinz Co., Pittsburg, Pa.---	Bruner & Huey, Monroe, N. C.--
3385	-----do-----	-----do-----	H. C. Watson, Rockingham, N.C.
3664	Salad Dressing, Royal-----	The Horton Cato Manufacturing Co., Detroit, Mich.	Clarence Sawyer, Asheville, N.C.
3625	Prepared Mustard, German	P. J. Ritter Conserve Co., Philadelphia, Pa.	-----do-----
3661	Salad Dressing, Durkee's----	E. R. Durkee Co., New York, N.Y.-----	-----do-----
3663	Salad Dressing, My Wife's.	My Wife's Salad Dressing Co., Jay St., New York, N. Y.	Clarence Sawyer, Asheville, N.C.
3877	Prepared Mustard, Williams'.	Williams Bros. Co., Detroit, Mich.	People's Grocery Co., Lumberton, N. C.
3879	Prepared Mustard, Excelsior.	Charles Gulden, New York, N. Y.	Bruner & Huey, Monroe, N. C.--
3880	Prepared Mustard, Dusseldorf.	-----do-----	Bridges & Co., Charlotte, N. C.--
3883	Prepared Mustard, Williams'.	Williams Bros. Co., Detroit, Mich.	Johnson Bros., Greenville, N. C.--
3621	Prepared Mustard, Dove----	The Frank Tea & Spice Co., Cincinnati, Ohio.	Theo. Atwell, Salisbury, N. C. --
4504	Prepared Mustard, French	-----do-----	J. R. Ferrall & Co., Raleigh, N. C.

RESULTS OF THE EXAMINATION OF PREPARED MUSTARDS,

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
3871	Chopped Pickle, Brunswick Relish.	George A. Bayles, St. Louis, Mo.---	People's Grocery Co., Lumberton, N. C.
3876	Prepared Mustard-----	Flaccus Bros., Wheeling, W. Va.---	G. W. Jones, Lumberton, N. C. -
3378	Prepared Mustard, Finest Quality.	Hirsch Bros. Co., Louisville, Ky.---	Foster Grocery Co., Monroe, N. C.

SALAD DRESSINGS, AND PICKLES—NO ADULTERATION FOUND.

Laboratory Number.	Adulterants.		Filler.	Remarks.
	Preservatives.	Coal-tar Dyes.		
3624	None found -----	None found -----	None found -----	Starch occurring naturally.
3627	do -----	do -----	do -----	
3665	do -----	do -----	do -----	
3721	do -----	do -----	do -----	
3722	do -----	do -----	do -----	
3872	do -----	do -----	do -----	
3875	do -----	do -----	do -----	
3881	do -----	do -----	do -----	
3882	do -----	do -----	do -----	
3884	do -----	do -----	do -----	
3885	do -----	do -----	do -----	
3664	do -----	do -----	do -----	
3625	do -----	do -----	Starch -----	
3661	do -----	do -----	do -----	
3663	do -----	do -----	do -----	
3877	do -----	do -----	do -----	Not properly labeled.
3879	do -----	do -----	do -----	
3880	do -----	do -----	do -----	
3883	do -----	do -----	do -----	
3621	do -----	do -----	do -----	
4504	do -----	do -----	do -----	

SALAD DRESSINGS, AND PICKLES—ADULTERATED.

Laboratory Number.	Chemical Preservatives.		Coal-tar Dyes.	Filler.
3871	Sulphites-----	None found-----		None found.
3876	Salicylic acid-----	do-----		do.
3878	Sulphites-----	do-----		Starch found.

SUN-DRIED AND EVAPORATED FRUIT.

Dried fruit is the clean, sound product made by drying mature, properly prepared, fresh fruit in such a way as to take up no harmful substance, and conforms in name to the fruit used in its preparation. Sun-dried fruit is dried fruit made by drying without the use of artificial means; evaporated fruit is dried fruit made by drying with the use of artificial means.

The adulteration of evaporated or dried fruit seems to have had but little attention from food officials, though chemical preservatives and bleaching agents have been used in them to some extent. The

RESULTS OF THE EXAMINATION OF EVAPORATED

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4376	Prunes, St. Clair-----	Horner & Co., San Jose, Cal.-----	M. Rosenthal & Co., Raleigh, N. C.
4377	Cocoonut, Dunham's Original.	Dunham Mfg. Co., New York-----	do -----
4378	Prunes, Yosemite-----	Yosemite Packing Co., Cal.-----	George S. Terrell, Raleigh, N. C.
4379	Prunes, Sunshine-----	Sanitary Fruit Co., Cal.-----	do -----
4381	Apples, Ontario-----	Brown Bros., Dispatch, N. J.-----	do -----
4382	Peaches-----	T. S. Southgate, Jobber, Norfolk, Va.	J. B. Green & Co., Raleigh, N. C.
4383	Peaches, Outing-----	Castel Bros., California-----	W. B. Mann, Raleigh, N. C.----
4384	Peaches, Sierra-----	Sierra Packing Co., California-----	do -----
4385	Apples, Dixie-----	-----	do -----
4386	Cocoonut, Aunt Lou's-----	Imperial Mfg. Co., Baltimore, Md.	A. S. Womble, Raleigh, N. C.----
4387	Prunes, Santa Clara-----	C. W. Antrim & Sons, Richmond, Va.	D. T. Johnson, Raleigh, N. C.----
4389	Cocoonut, Aunt Lou's-----	Imperial Mfg. Co., Baltimore, Md.	J. E. Rudy & Co., Raleigh, N. C.
4391	Prunes, Commanding-----	North Ontario Packing Co., North Ontario, Ont.	J. S. McCullers, Raleigh, N. C.---
4394	Cocoonut, Wetmore's-----	Wetmore Mfg. Co., Philadelphia, Pa.	-----
4395	do-----	-----	Clarence Sawyer, Asheville, N. C.
4397	Cocoonut, Dunham's Original.	Dunham Mfg. Co., New York-----	G. A. Greer, Asheville, N. C.----

use of the preservative is to prevent the fruit souring or spoiling when it is poorly and imperfectly dried. By the use of the preservative more moisture could be left in the fruit without the danger of it spoiling. As dried fruit is usually sold by weight, any moisture left in it would increase its weight and be sold at the price of the fruit.

The bleaching agents are of course used to improve the appearance of the fruit, or prevent it turning dark on drying.

Under this head only 23 samples were examined. They appeared to be true to name, and were tested for preservatives and bleaching agents. Seven, or 30 per cent of them, proved to contain sulphites which act both as a preservative and bleaching agent.

OR DRIED FRUITS—NO ADULTERATION FOUND.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4376	None found -----	None found-----	Fruit in good condition.
4377	----do -----	----do-----	do.
4378	----do -----	----do-----	do.
4379	----do -----	----do-----	do.
4381	----do -----	----do-----	do.
4382	----do -----	----do-----	do.
4383	----do -----	----do-----	do.
4384	----do -----	----do-----	do.
4385	----do -----	----do-----	do.
4386	----do -----	----do-----	do.
4387	----do -----	----do-----	do.
4389	----do -----	----do-----	do.
4391	----do -----	----do-----	do.
4394	----do -----	----do-----	do.
4395	----do -----	----do-----	do.
4397	----do -----	----do-----	do.

RESULTS OF THE EXAMINATION OF EVAP

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4380	Peaches, Golden Dragon---	Reid, Murdock & Co., Chicago, Ill.	-----
4388	Peaches, Yosemite-----	Yosemite Packing Co., Santa Clara, Cal.	D. T. Johnson, Raleigh, N. C.---
4390	Cocoanut, Dove-----	The Frank Tea and Spice Co., Cincinnati, Ohio.	T. L. McCullers, Raleigh, N. C.---
4392	Peaches, Yosemite AA-----	Yosemite Packing Co., Santa Clara, Cal.	-----do-----
4393	Peaches, Purity-----	-----	-----
4396	Cocoanut, Baker's Brazil--	Franklin-Baker Co., Philadelphia, Pa.	G. A. Greer, Asheville, N. C.----
4193	Cocoanut, Purity*-----	The Frank Tea and Spice Co., Cincinnati, Ohio.	-----

*Sent to the Department by local dealers or others for analysis.

VINEGAR.

It is well known that acetic acid is the principal constituent of vinegar, but the latter also contains small quantities of ethyl acetate, aldehyde, alkaline acetates, and tartrates and small amounts of various other salts, depending on the substance from which it is produced. It is the result of either the acetous fermentation of dilute alcohol or the distillation of wood. It is also well known that vinegar can be produced from all alcoholic sources. It is often made by spontaneous alcoholic and subsequent acetous fermentation of fruit juice stored in casks, but is more often produced by passing the dilute alcoholic liquids over shavings or twigs impregnated with acetic ferments, principally "*mycoderma aceti*," a regulated supply of air being maintained at the same time.

Vinegar, exposed to the air, deteriorates on long standing, and loses more or less of its acidity. The disappearance of the acetic acid is also due to fermentation, which takes place with an excess of air. Therefore, when the acetic fermentation is complete—that is, when all the alcohol is changed into acetic acid—the containing vessel should be closed to exclude the air.

The food standards established by the Secretary of Agriculture of the United States and adopted by the North Carolina Board of Agriculture, recognize six kinds of vinegar, namely:

(1) Vinegar, cider vinegar or apple vinegar, made by the fermentation of the juice of apples. It contains not less than 4 per cent of acetic acid, 1.6 per cent of apple solids, and 0.25 per cent of apple ash. It is the most desirable and choice kind of vinegar, on account of its flavor; it commands the highest price on the market, and is,

ORATED OR DRIED FRUITS—ADULTERATED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4380	Sulphites -----	None found -----	Fruit in good condition.
4388	---do-----	---do-----	do.
4390	---do-----	---do-----	do.
4392	---do-----	---do-----	do.
4393	---do-----	---do-----	do.
4396	---do-----	---do-----	do.
4193	---do-----	---do-----	do.

therefore, often imitated and more often adulterated with other vinegars, which are also frequently labeled and sold in its name.

(2) Wine vinegar, or grape vinegar, made by the fermentation of the juice of grapes. It contains not less than 4.0 per cent of acetic acid, 1.4 per cent of grape solids, and 0.13 per cent of grape ash. It is the principal vinegar of European commerce, and with the exception of apple cider vinegar is the most desirable.

(3) Malt vinegar, made by the fermentation, without distillation of an infusion of barley malt or cereals whose starch has been converted by malt. It contains not less than 4.0 per cent of acetic acid, 2.0 per cent of solids, and 0.2 per cent of ash.

(4) Sugar vinegar, made by the fermentation of sugar, syrup, molasses, or refiner's syrup. It contains not less than 4.0 per cent of acetic acid.

(5) Glucose vinegar, made by the fermentation of glucose sugar, glucose, or glucose syrup. It contains not less than 4.0 per cent of acetic acid.

(6) Spirit vinegar, distilled vinegar, or grain vinegar, made by the fermentation of dilute distilled alcohol. It contains not less than 4.0 per cent of acetic acid. It has but little flavor other than that of acetic acid, and is usually colored with caramel to simulate other more desirable vinegars.

Fraud is practiced by selling one vinegar for another, or by adding a cheaper variety to a more expensive or desirable one, and selling it as the more desirable article. The great demand for apple cider vinegar causes the manufacturers of other vinegars to label their products "Apple Vinegar," "Cider Vinegar," "Fruit Vinegar," or "Family Vinegar," which is a fraud to the consumer and an unjust competition to the fruit industry.

SAMPLES EXAMINED.

Number of samples examined.....	21
Number of samples sent to the Department by dealers and others,	6
Number of samples collected by the Department.....	15
Number of samples found as represented.....	8
Number of samples not found as represented.....	7

More than 46 per cent of the official samples examined were not as branded or represented. It is not known what claim was made for the samples sent to the Department by dealers for analysis.

Five of the official samples were sold under brand names as "Monogram" and "Blue Grass Belle," etc. One sample of the "Monogram" was represented by the dealer to be an apple cider vinegar,

RESULTS OF THE EXAMINATION.

Laboratory Number.	Brand Name from Label or Represented to be.	Manufacturer or Wholesaler.	Retail dealer.
4398	Vinegar*-----	-----	W. A. Maunay, Kings Mountain
4401	----do*-----	-----	Dunn Bros., Raleigh, N. C.-----
4399	----do*-----	-----	W. A. Maunay, Kings Mountain
4400	----do*-----	-----	----do-----
4406	----do*-----	-----	P. H. Johnson, High Point-----
4434	Vinegar, Our Own Apple Cider.	The Hicks Co., Wilmington, N. C.	L. H. Caldwell, Lumberton-----
4435	Vinegar, Monogram (Blend)	R. M. Hughes & Co., Louisville, Ky.	Caldwell & Carlyle, Lumberton -
4436	Vinegar, Apple Cider-----	Oklahoma Vinegar Co.-----	O. R. Phillips, Lumberton-----
4437	Vinegar, Cider, Blue Grass Belle.	Jones Bros. & Co., Louisville, Ky.	Crump & Floyd, Lumberton ----
4438	Vinegar, White Wine-----	Hirsch Bros. & Co., Louisville, Ky.	John T. McNeill, Red Springs---
4439	Vinegar, Apple Cider-----	Howard & Brawer, Richmond, Va.	M. S. Talbert, Red Springs-----
4440	Vinegar, Our Own Apple Cider.	The Hicks Co., Wilmington, N. C.	J. T. Bostic, Red Springs-----
4441	Vinegar, Distilled Spirit, Colored.	Jones Bros. & Co., Louisville, Ky.	Sikes-Curry Co., Red Springs---
4351	Vinegar, Apple Cider-----	Burr Mfg. Co., Richmond, Va.	D. T. Moore, Sr., Raleigh -----
4411	Vinegar*-----	-----	Randolph Bros., House-----
4451	Vinegar, Old Apple-----	Louisville Cider and Vinegar Co., Louisville, Ky.	G. T. Powell, Raleigh-----
4452	Vinegar, Monogram (Blend)	R. M. Hughes & Co., Louisville, Ky.	C. W. Jones & Bro., Raleigh-----
4453	Vinegar, Heinz Rex Amber--	H. J. Heinz Co., Pittsburg, Pa.	B. W. Jones, Raleigh-----
4455	Vinegar, Apple Cider-----	-----	E. L. Goble Bros., Raleigh -----
4456	Vinegar, Monogram (Blend)-	R. M. Hughes & Co., Louisville, Ky.	M. A. Daniels, Raleigh -----
4457	Vinegar, Cider, Blue Grass Belle.	Jones Bros. & Co., Louisville, Ky.	E. N. Pool, Raleigh -----

*Sent to the Department by local dealers and others for analysis.

claiming that it had been sold to him for that product. The branding on the barrel was indistinct and could not be read. The samples branded Blue Grass Belle proved to be cider vinegar; the samples branded Monogram (blend) proved to be compound vinegar. Samples No. 4435 and No. 4440 were branded on the barrel "Our Own Apple Cider Vinegar," but proved to be compound products.

When vinegar is sold without naming the class to which it belongs, according to the standards adopted by the Secretary of Agriculture of the United States, it means a product made from apples. Therefore, when a vinegar is sold under a brand name it should state the class to which it belongs; otherwise, it will be, according to the standards, presumed to be an apple cider vinegar; then, in case it is not an apple vinegar, it will be classed as misbranded.

NATION OF VINEGARS.

Laboratory Number.	Total Acidity (Acetic Acid) — Per Cent.	Total Solids — Per Cent.	Ash — Per Cent.	Lead Subacetate.	Sodium Bicarbonate.	The indications are that this is—
4398	8.95	.33	.06	-----	-----	Distilled spirit vinegar, pickling.
4401	4.18	2.92	.38	Precipitate -----	Slightly darker	Apple cider vinegar.
4399	4.08	1.83	.21	----do-----	Black -----	do.
4400	4.28	.63	.07	Turbidity -----	Slightly dark	Compound or mixed vinegar.
4406	3.21	.45	.04	----do-----	----do-----	Compound or mixed vinegar, below standard.
4434	3.64	.34	.05	----do-----	-----	Vinegar, adulterated, misbranded.
4435	5.30	.67	.07	----do-----	-----	Compound or mixed vinegar, colored.
4436	4.18	.35	.02	Slight precipitate -	Slightly darker	Vinegar, adulterated, misbranded.
4437	4.52	1.96	.29	Heavy precipitate -	Very dark	Apple cider vinegar.
4438	5.25	.11	.02	-----	-----	Distilled spirit vinegar, misbranded.
4439	4.67	1.40	.05	Slight precipitate -	Slightly darker	Vinegar, adulterated.
4440	4.80	.30	.03	Turbidity -----	-----	Vinegar, adulterated, misbranded.
4441	3.89	.47	.07	Slight precipitate -	-----	Distilled spirit vinegar, below standard.
4351	4.15	.35	.04	-----	-----	Distilled spirit vinegar, colored adulterated, misbranded.
4411	4.76	1.38	.24	Precipitate -----	Dark -----	Apple cider vinegar, adulterated.
4451	3.94	.68	.12	Small precipitate -	Slightly darker	Compound or mixed vinegar, adulterated.
4452	4.72	1.35	.03	----do-----	----do-----	Compound or mixed vinegar, colored.
4453	4.28	1.25	----do-----	-----	-----	Sugar vinegar.
4455	4.04	2.68	.30	Precipitate -----	Slightly darker	Seems to be an apple cider vinegar.
4456	4.28	1.37	.08	Small precipitate -	----do-----	Compound or mixed vinegar, colored.
4457	4.86	1.94	-----	Large precipitate -	Very dark	Apple cider vinegar.

NON-ALCOHOLIC SUMMER DRINKS.

Under this head are included only a few flavored carbonated bottled waters and the syrups from which such drinks are prepared. No

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
3729	Cream-Cola -----	Hickory Bottling Works, Hickory, N. C.	Young & Drum, Hickory, N. C. -
3901	Cream Soda-water -----		D. F. Pence, Rockingham, N. C.
3905	Coca-Cola -----	Coca-Cola Co., Atlanta, Ga. ----	George Kirakos, Charlotte, N. C.
3683	Raspberry Acid, Ross's Royal.	W. A. Ross & Sons, Belfast, Ireland.	G. A. Greer, Asheville, N. C. ----
4076	Coca-Cola -----	Coca-Cola Bottling Works, Raleigh.	B. W. Jones, Raleigh, N. C. ----
3684	Raspberry Acid -----	Cross & Blackwell, London, England.	G. A. Greer, Asheville, N. C. ----
3688	Lime Juice, Ross's -----	W. A. Ross & Bro., London, England.	----do -----

MALTS, BEERS, ALES, PHOSPHATES, AND CIDERS.

Since the sale of intoxicating liquors is prohibited in North Carolina, outside of incorporated towns, and many of the towns have passed local option laws, and therefore license to sell intoxicants cannot be had in those places, there is a tendency to evade the law by selling beverages that are supposed to be, and even in some cases are labeled non-alcoholic or temperance drinks, many of which contain alcohol. They are sold under various names, the phosphates and

RESULTS OF THE EXAMINATION OF MALTS, BEERS, ALES,

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4249	Malt, Extract, Canadian* ----	Canadian Malt Extract Co., New York.	W. D. Covington, Spray, N. C. --
4252	Lar Bar* -----	Consumers Brewing Co., Norfolk, Va.	A. L. Bell, Goldsboro, N. C. ----
4253	Lager Brew* -----	Afri-Kola Co., Atlanta, Ga. ----	----do -----
4254	Beer* -----	Roseneck Brewing Co., Richmond, Va.	----do -----
4255	Cuban Ade* -----	E. Dannenberg, Wilson, N. C. --	E. Dannenberg, Wilson, N. C. --
4257	Beer* -----		Baker & Brinkley, Wilson, N. C.
3687	Apple Juice -----	Battle Creek Sanitarium Co., Battle Creek, Mich.	G. A. Greer, Asheville, N. C. ----
4459	Grape Juice -----	Gleason's Grape Juice Co., Fredonia, S. C.	-----

adulteration is expected in this class of goods except chemical preservatives and objectionable coloring matter, both of which are very unnecessary, as there seems to be no question but that such drinks can be put up and kept in good condition without antiseptics, and there is no good reason for the use of foreign chemicals in them.

NON-ALCOHOLIC SUMMER DRINKS.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
3729	None found -----	Coal-tar Dye -----	Adulterated.
3901	---do-----	None found -----	
3905	---do-----	---do-----	
3683	Salicylic Acid, large amount.-----	-----	Adulterated.
4076	None found -----	None found -----	
3684	Salicylic Acid -----	---do-----	Adulterated.
3688	---do-----	Coal-tar Dye -----	do.

ciders often naming the fruit from which they are supposed to be made. Most of them, however, are artificial products and contain no fruit juice at all.

Within the past year 91 samples of this class of beverages have been sent to the Department by local dealers, city officials and others, for the determination of alcohol and adulterants.

Of these samples 32 were adulterated with either a chemical preservative or a coal-tar dye, and 65 of them contained alcohol varying in amounts from 0.3 per cent to 12 per cent.

PHOSPHATES, AND CIDERS—NO ADULTERANTS FOUND.

Laboratory Number.	Alcohol—Per Cent by Vol.	Solids, Matter in Solution—Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4249	4.10	6.60	None found -----	None found -----	
4252	0.0	1.40	---do-----	---do-----	
4253	.70	1.40	---do-----	---do-----	
4254	.60	1.14	---do-----	---do-----	
4255	1.75	2.22	---do-----	---do-----	Not properly labeled.
4257	5.05	4.45	---do-----	---do-----	
3687			---do-----	---do-----	
4459			---do-----	---do-----	

RESULTS OF THE EXAMINATION OF MALTS, BEERS, ALES, PHOS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
3997	Grape Juice, Fenner's Chautauqua.	Chautauqua Grape and Fruit Juice Co., Westfield, N. Y.	Williams-Little Grocery Co., Wilson, N. C.
3898	Grape Juice, Golden Arbor.	Francis H. Leggett, New York.	H. C. Watson, Rockingham, N. C.
4410	Rikk*	-----	J. P. Herman, Hudson, N. C.-----
4461	Vim*	Haynor Mfg. Co., Norfolk, Va.	-----
4413	Root Beer*	-----	Gastonia Tanning Co., Gastonia, N. C.
4414	---do*	-----	do-----
4417	Beer*	Anheuser-Busch Brewing Association, St. Louis, Mo.	Dispensary, Raleigh, N. C.-----
4458	Rikk*	Gottlieb Baubruschmidt-Straus Co., Baltimore, Md.	J. R. Williams, Hudson, N. C.---
3726	Ginger Ale, Boatright's	Hickory Bottling Works, Hickory, N. C.	Yount & Drum, Hickory, N. C.---
3728	Sarsaparilla, Boatright's	do	do-----
3900	Ginger Ale, Harris' Lithia	Harris' Lithia Springs Co., Harris Springs, S. C.	W. L. Williams, Rockingham, N. C.
4149	Cherry Phosphate*	Oklahoma Vinegar Co.	Pate & Co., Apex, N. C.-----
4150	Apple Cider, Puritan*	-----	do-----
4151	Beerine*	-----	R. C. Heitman, Lexington, N. C.
4152	Ginger Ale*	-----	do-----
4192	Cider, Crab-apple*	Huffine's, Greensboro, N. C.	A. Finch, Selma, N. C.-----
4200	Beer, Budweiser*	Anheuser-Busch Brewing Association, St. Louis, Mo.	Dispensary, Raleigh, N. C.-----
4201	---do*	do	do-----
4258	Malt Extract, Pinnacle*	New South Brewing and Ice Co., Middlesboro, Ky.	Madison County Dispensary, Marshall, N. C.
4349	Lar Bar*	Randleman Bottling Co., Randleman, N. C.	-----
4363	Beer*	Virginia Brewing Co., Roanoke, Va.	Dispensary, Raleigh, N. C.-----
4355	Apple Juice, Duffy's 1842*	American Fruit Co., Rochester, N. Y.	-----
4494	Vim*	Haynor Mfg. Co., Norfolk, Va.	-----
4357	Cider*	-----	Robert Taylor, near Pinehurst, N. C.
4368	Cuban Ade*	E. Dannenberg, Wilson, N. C.	National Drug Co., Wilson, N. C.
4404	Malt Extract, Pinnacle*	New South Brewing Co., Middleboro, Ky.	-----
4197	Beer, Pilsener*	John Eichler Brewing Co., New York.	Dispensary, Raleigh, N. C.
4198	Beer, Imperial Pilsener*	Chattanooga Brewing Co., Chattanooga, Tenn.	do-----
4199	Beer, Champagne*	Roseneck Brewing Co., Richmond, Va.	do-----
4141	Beer*	-----	Dispensary, Henderson, N. C.---
4143	---do*	-----	do-----
4207	Cuban Ade*	E. Dannenberg, Wilson, N. C.	W. O. White & Bro., Dover, N. C.
4208	---do*	do	Chas. S. Wallace, Morehead, N. C.
4210	Beer, Schlitz*	Joseph Schlitz Brewing Co., Milwaukee, Wis.	Dispensary, Wilson, N. C.-----
4213	Cuban Ade*	E. Dannenberg, Wilson, N. C.	-----
4221	---do*	do	H. G. Ourn, Warsaw, N. C.---

*Samples sent to the Department by local dealers and others for analysis.

PHATES, AND CIDERS—NO ADULTERANTS FOUND—CONTINUED.

Laboratory Number.	Alcohol--Per Cent by Vol.	Solid Mat- ter in Solu- tion--Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
3997			None found	None found	
3898			do	do	
4410	3.15	3.21	do	do	
4461	3.25	3.75	do	do	
4413	2.45	4.47	do	do	
4414	1.75	3.73	do	do	
4417	4.75	5.27	do	do	
4453	3.10	3.53	do	do	
3726			do	do	
3728			do	do	
3900			do	do	
4149	0.00	17.21	do	do	
4150	11.10	11.22	do	do	
4151	1.45	1.85	do	do	
4152	6.36	1.98	do	do	
4192	6.20	4.90	do	do	
4200	4.15	4.84	do	do	
4201	4.60	5.43	do	do	
4258	3.90	7.75	do	do	
4349	.60	1.08	do	do	
4363	5.30	6.06	do	do	
4355	0.00	15.06	do	do	
4494	2.35	3.26	do	do	
4357	8.60	12.21	do	do	
4368	4.05	3.26	do	do	
4404	6.05	7.19	do	do	
4197	4.30	5.43	do	do	
4198	5.50	4.78	do	do	
4199	2.85	5.46	do	do	
4141	4.40	5.27	do	do	
4143	3.55	5.20	do	do	
4207	1.70	2.72	do	do	
4208	2.35	2.44	do	do	
4210	4.55	5.26	do	do	
4213	2.25	2.69	do	do	
4221	2.50	2.72	do	do	

RESULTS OF THE EXAMINATION OF MALTS, BEERS, ALES, PHOS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4227	Cuban Ade* -----	E. Dannenberg, Wilson, N. C. --	J. T. Davenport, Morehead, N. C.
4219	Beer, Pale Lager* -----	Anheuser-Busch Brewing Association, St. Louis, Mo.	-----
4220	Beer, Dixie* -----	Old Dominion Brewing and Ice Co., Newport News, Va.	-----
4234	Beer, Schlitz* -----	Joseph Schlitz Brewing Co., Milwaukee, Wis.	Thomas Heartt, Raleigh, N. C. -
4235	----do* -----	do -----	George Badger, Raleigh, N. C. --
4230	Malt Tonic, Red Cross* -----	Red Cross Malt Extract Co., New York, N. Y.	Casper Co., Winston-Salem, N. C.
4236	Cuban Ade* -----	E. Dannenberg, Wilson, N. C. --	J. L. Speight, Parmele, N. C. ---
4237	Cider* -----	-----	H. M. Jenkins Co., Washington, N. C.
4238	Malt, No. 1* -----	-----	Mount Airy Furniture Co., Mount Airy, N. C.
4239	Malt, No. 2* -----	-----	do -----
4240	Cuban Ade* -----	E. Dannenberg, Wilson, N. C. --	W. M. Powell, Parmele, N. C. ---
4241	Beerine* -----	Sanford Carbonating Co., Sanford, N. C.	W. S. Weatherspoon, Sanford, N. C.
4243	Beer, Pink* -----	Hobelman-Collhib Co., Baltimore, Md.	Adams Grain and Provision Co., Charlotte, N. C.
4245	Beer* -----	-----	E. W. Hoffman, Gastonia, N. C. -
4248	Malt Extract, Capuzeiner* ---	Virginia Brewing Co., Roanoke, Va.	J. B. Cody, Mount Airy, N. C. --

*Samples sent to the Department by local dealers and others for analysis.

RESULTS OF THE EXAMINATION OF MALTS, BEERS,

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4177	Beer, Budweiser* -----	Anheuser-Busch Brewing Association, St. Louis.	Dispensary, Raleigh -----
4196	Beer, Hofbrau* -----	Robert Portner Brewing Co., Alexandria, Va.	----do -----
4352	Beerine* -----	-----	C. D. Koonce, Chadbourn, N. C. -
4367	Malt, Eureka Canada* -----	Darley Park Brewery, Baltimore, Md.	National Drug Co., Wilson, N. C.
4369	Phosphate, Orange* -----	Anderson & Co., Atlanta, Ga.	-----
4370	Phosphate, Cherry* -----	do -----	-----
4371	Phosphate, Mexican Hot* -----	do -----	-----
4372	Phosphate, Elberta Peach* -----	do -----	-----
4373	Phosphate, Grape* -----	do -----	-----
4374	Phosphate, Blackberry* -----	do -----	-----
4375	Phosphate, Catawba Grape* -----	do -----	-----
4403	Beer, Tivoli* -----	Robert Portner Brewing Co., Alexandria, Va.	J. R. Uzzell, Wilson, N. C. -----
4142	Beer* -----	-----	Henderson Dispensary, Henderson, N. C.
4209	Phosphate, Blackberry* -----	-----	Charles S. Wallace, Morehead --

PHATES, AND CIDERS—NO ADULTERANTS FOUND—CONTINUED.

Laboratory Number.	Alcohol—Per Cent by Vol.	Solid Matter in Solution—Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4227	2.40	2.69	None found -----	None found -----	Not labeled according to law.
4219	4.60	5.28	do -----	do -----	
4220	4.30	5.93	do -----	do -----	
4234	4.50	5.49	do -----	do -----	
4235	4.40	5.50	do -----	do -----	
4230	4.95	4.97	do -----	do -----	
4236	2.05	2.71	do -----	do -----	
4237	9.65	9.99	do -----	do -----	
4238	4.70	3.49	do -----	do -----	
4239	3.00	4.37	do -----	do -----	
4240	2.15	2.74	do -----	do -----	
4241	0.30	0.76	do -----	do -----	
4243	4.45	4.50	do -----	do -----	
4245	2.95	3.66	do -----	do -----	
4248	1.80	1.30	do -----	do -----	Not properly labeled.

ALES, PHOSPHATES, AND CIDERS—ADULTERATED.

Laboratory Number.	Alcohol—Per Cent. by Vol.	Solid Matter in Solution—Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4177	4.65	5.32	Salicylic Acid -----		
4196	5.00	4.80	do -----		
4352	.90	1.25	do -----		Not properly labeled—does not show name of mfr.
4367	2.70	5.18	do -----		
4369	0.00	27.98		Coal-tar Dye -----	
4370	0.00	25.68		do -----	Not properly labeled—does not show name of mfr. do.
4371	0.00	27.07		do -----	
4372	0.00	24.59		do -----	
4373	0.00	24.01		do -----	
4374	0.00	27.59		do -----	
4375	0.00	27.53		do -----	
4403	4.25	5.13	Salicylic Acid -----		
4142	4.75	4.62	do -----		
4209	6.35	22.78	do -----	Coal-tar Dye -----	

RESULTS OF THE EXAMINATION OF MALTS, BEERS, ALES,

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4212	Malt, Prima Tonic*-----	Independent Brewing Associa- tion, Chicago, Ill.	Montgomery Drug Co., Troy---
4315	Cider*-----		H. J. Holbrook, Brookford-----
4246	Phosphate, Blackberry*-----	Haynor Mfg. Co., Norfolk, Va.	J. R. Billups, Winfall-----
4256	Beer*-----	Robert Portner Brewing Co., Alexandria, Va.	Corbett & Co., Wilson-----
3685	Cider, Sparkling Golden Russet.*-----	S. R. & J. C. Mott, Rochester, N. Y.	G. A. Greer, Asheville-----
3995	Cider, Golden Russet*-----	do-----	Williams-Little Grocery Co., Wilson.
3725	Birch Beer, Boatright's-----	Hickory Bottling Works, Hickory, N. C.	Young & Drum, Hickory-----
3727	Cherry Phosphate, Boatright's.	do-----	do-----
3899	Ginger Ale, Harris' Lithia-----		D. F. Pense, Rockingham-----
3902	Cherry Phosphate-----	Brannan, Charlotte, N. C.-----	George Kirakos, Charlotte-----
3903	Orange Phosphate-----	do-----	do-----
4464	Peach Cider*-----		G. S. Kernodle, Reidsville-----
4465	Malt, Eureka Canada*-----	Darley Park Brewing Co., Baltimore, Md.	C. L. W. Smith, Smithfield-----
4466	Beer, Hofbrau*-----	Robert Portner Brewing Co., Alexandria, Va.	do-----
4467	Beer, Venetian Cabinet*-----	do-----	do-----
4468	Root Beer*-----	Coca-Cola Bottling Works, Wilson, N. C.	E. Dannenberg, Wilson-----
4469	Cincinnatus*-----	E. Dannenberg, Wilson, N. C.	do-----
4470	Beer, Venetian Cabinet*-----	Robert Portner Brewing Co., Alexandria, Va.	do-----

*Samples sent to the Department by local dealers or others for analysis.

DISTILLED LIQUORS.

The most important of this class of products are brandy and whiskey, the latter being of the greatest commercial importance, and the principal subject of this investigation.

Distilled spirits, corresponding closely to whiskey was known to the Egyptians in very early ages. When the English invaded Ireland they found the manufacture of whiskey a fairly well understood art. Malted barley alone was then used in the manufacture of whiskey, and the small, or pot-still, was employed in its distillation.

Whiskey is now largely made from fermented grain, but potatoes, etc., are also used. In some cases the grain is malted, but the raw grain is more often used. When the unmalted grain is used the first distillation produces a crude product, which is redistilled; but when the malted grain has been used small stills are employed and the product is not redistilled.

PHOSPHATES, AND CIDERS—ADULTERATED—CONTINUED.

Laboratory Number.	Alcohol— Per Cent by Vol.	Solid Matter in Solution— Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4212	5.20	8.42	Salicylic Acid-----	-----	
4315	8.45	7.46	do-----	-----	
4246	0.00	32.10	do-----	Coal-tar Dye-----	
4256	4.75	4.61	do-----	-----	
3685			do-----	-----	
3995			Benzoic Acid-----	-----	
3725			Salicylic Acid-----	-----	
3727			do-----	Coal-tar Dye-----	
3899			do-----	-----	
3902				Coal-tar Dye-----	
3903				do-----	
4464	12.01	17.34	Salicylic Acid-----	-----	
4465	4.95	5.75	Salicylic Acid, large amount.	-----	
4466	5.00	5.52	do-----	-----	
4467	5.20	5.18	do-----	-----	
4468	0.00	11.33	Salicylic Acid-----	-----	
4469	1.75	1.85	Salicylic Acid, large amount.	-----	
4470	4.75	4.62	do-----	-----	

Another method of manufacturing whiskey is recognized by the laws of the country. That process of manufacturing is known as blending.

The whiskeys found on the market may be classified as follows:

1. Whiskey manufactured wholly by the distiller, under the supervision of the government. This whiskey is matured or aged in wood, and leaves the government warehouse bearing two stamps—one that of the warehouse and the other a tax stamp. This is known as a straight whiskey and may be bottled while in the government warehouse and sealed by a government stamp, when it is said to be bottled in bond.

2. Blended whiskeys are made by taking two or more whiskeys of the first class and blending them in such proportions that certain properties may be developed. The quantity of this class of whiskey found on the market is comparatively small, there being no commercial inducement, since the blend has no particular advantage over a

straight whiskey and cannot be produced as cheaply as the latter, or the original whiskies from which it is produced.

3. By far the largest class of whiskey is made by adding "silent spirits," or "cologne spirits" and water, to a whiskey of the first class. Generally caramel is added to restore the color lost by the addition of the spirits and water. In this way the volume of whiskey of the first class used is increased to several times its original quantity.

The flavor of this class of whiskey is imparted by the original whiskey of the first class used in the manufacture, though of course not so pronounced. As the original whiskey is mixed with silent spirits and water, this process of manufacture is called blending, though improperly so called.

According to the rules and regulations for the enforcement of the National Food Law, the term "blend" applies to a mixture of like substances. The process is also called rectifying, as the manufacturer has a rectifier's license, and uses the rectified spirits. Probably 75 per cent, or decidedly the largest part of the whiskey on the market, belongs to this class.

4. A fourth class of whiskey on the market is a whiskey that is wholly artificial. It is made by adding water, coloring matter, beading oil, and various essences for flavoring to silent spirits. When this class of whiskey is named at all, it is classified, by the manufacturer, as a blended or rectified whiskey. As it is wholly an artificial product, it appears to have no right to be so called.

From the foregoing it is very evident that the term whiskey, as generally used, refers to quite a variety of products, necessarily varying in composition. The composition of the normal constituents and their proportions in a pure whiskey is supposed to be well known, but such is hardly the case. The literature on the subject is very meager, and the subject of distilled liquors seems to have received but little attention at the hands of chemists. Very few results of analyses are available.

Whiskey is a very complex liquid. In addition to about 45 to 50 per cent by volume of ethyl alcohol and 50 to 55 per cent of water, it contains a number of other substances. Of these substances Allen (Analyst, June, 1901) says: "The secondary constituents of spirits are by no means to be regarded in the light of impurities, as they have wrongly been called and considered by some. They are the associated bodies which give the alcohol its special and valued characteristics, and to their production, modification or elimination by age we owe the change which spirits undergo during the process of maturing."

It is well known that new whiskey is harsh, unpalatable, and not fit for use. The government controls bonded warehouses where whiskey is stored during maturation. It is stored in charred barrels, and the theory is that during this storage the fusil oil, or higher alcohols, are either absorbed, eliminated or so changed by oxidation

that the whiskey loses its harsh, unpalatable flavor. Professor Shepard, of the Food and Dairy Commission of South Dakota, says that the above theory is entirely wrong, and that the assumption that the quantity or percentage of higher alcohols decrease by aging is not based upon any experimental evidence, and that what evidence we do now have tends to show that the percentage of these alcohols increase by aging instead of decrease.

The raw, harsh taste of new whiskey is attributed by some good authority to the presence of pyrrol, some alkaline and sulphur compounds and phenolic bodies. The pyrrol is supposed to resinify and the others are unstable and are oxidized during the process of aging or maturing.

It is evident that very marked changes take place in distilled liquors, on the properly aging or maturing of them, but with our present knowledge of the subject, it is safe to say that we do not know, for certain, what those changes are.

What has been said of whiskey is largely true of brandy, except that the latter is made from fermented fruit juice instead of cereal products.

SAMPLES EXAMINED.

Distilled liquors were examined as follows:

Whiskey	22
Brandy	3
Gin	2
Rum	1
	—

Total number of distilled liquors..... 28

Of the 22 samples of whiskey, 7 seem to be straight whiskies properly aged, though some of them had some appearance of having had a small amount of silent spirit and water added to them. Twelve proved to be so-called blends, composed of whiskey, silent spirits, water, coloring matter, and flavoring essences.

The quantity of real whiskey in these so-called blends ranged from a very small quantity in some of them to probably 50 per cent in others.

Three samples proved to be entirely artificial products, made up of silent spirits, water, coloring matter, beading oils, and flavoring essences.

Only the alcohol and solid matter in solution were determined quantitatively, the former being expressed in terms of both percentage and proof, and the solid matter in percentage. Only qualitative examination for the secondary constituents was made. The class of a whiskey is revealed largely by the character of its solid matter in solution.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label or as Represented by the Sender.	Manufacturer or Wholesaler.	Retail Dealer.
4111	Whiskey, Corn, Laurel Valley*	W. W. Cooper & Co., Marion, N.C.	Dispensary, Henderson.
4112	Whiskey, Corn, Turkey Mountain.*	D. L. Arey Distilling Co., Salisbury, N. C.	---do-----
4113	Whiskey, Corn, Catawba Valley.*	R. H. Bennett & Co., Marion, N. C.	---do-----
4114	Whiskey, Old Corn*-----	Lorrenstein & Co., Atlanta, Ga.	---do-----
4115	Whiskey, Rye, G. P. R.*-----	G. Gump & Sons, Baltimore, Md.	---do-----
4116	Whiskey, Rye, Manhattan*-----	Meyer, Pitt & Co., Baltimore, Md.	---do-----
4117	Whiskey, Rye, Old Velvet*-----	Bluthenthal & Bickart, Atlanta, Ga.	---do-----
4118	Whiskey, Rye, Stuart*-----	Davis & Atkins, Richmond, Va.	---do-----
4119	Whiskey, Rye, Old Baker*-----	Garrett-Williams Co., Baltimore, Md.	---do-----
4120	Whiskey, Rye, Billy Baxter*-----	Chas. M. Pfeifer & Co., Cincinnati, Ohio.	---do-----
4121	Whiskey, Vine Springs Malt*-----	J. T. S. Brown & Sons, Louisville, Ky.	---do-----
4122	Whiskey, Deep Run Hunt Club.*	E. A. Saunders' Sons Co., Richmond, Va.	---do-----
4123	Whiskey, Rye, Anderson Club*-----	Chas. M. Pfeifer & Co., Cincinnati, Ohio.	---do-----
4124	Whiskey, Rye, Green River*-----	W. P. Ives & Co., Norfolk, Va.	---do-----
4125	Whiskey, Rye, Virginia Club*-----	The Ellison-Harvey Co., Richmond, Va.	---do-----
4127	Whiskey, Rye, Fairmount*-----	Brunhill, Simon & Co., Philadelphia, Pa.	---do-----
4128	Whiskey, Rye, Hunter*-----	Wm. Lanahan & Sons, Baltimore, Md.	---do-----
4129	Whiskey, Rye, Paul Jones*-----	Paul Jones & Co., Louisville, Ky.	---do-----
4130	Whiskey, Rye, Gordon*-----	G. Gump & Sons, Baltimore, Md.	---do-----
4131	Whiskey, Rye, Overholt*-----	W. P. Ives & Co., Norfolk, Va.	---do-----
4132	Whiskey, Rye, Fulcher*-----	E. A. Saunders' Sons Co., Richmond, Va.	---do-----
4138	Brandy, California*-----	J. T. S. Brown & Sons, Louisville, Ky.	---do-----
4139	Brandy, Apple*-----	J. & E. Mahoney, Portsmouth, Va.	---do-----
4140	Brandy, Jules Leraux Cognac*-----	Meyer, Pitt & Co., Baltimore, Md.	---do-----
4144	Gin, Old Town*-----	H. J. Williams & Co., Norfolk, Va.	---do-----
4145	Gin, Rye Malt*-----	Beech Hill Distilling Co., Cincinnati, Ohio.	---do-----
4146	Rum, New England*-----	Davis & Atkins, Richmond, Va.	---do-----
4046	Whiskey, Corn*-----		A. H. Slocum, Fayetteville, N.C.

WINES.

Wine is the fermented juice of the grape. The grapes are crushed and the juice expressed. It is placed in vats and allowed to undergo a natural fermentation, the addition of yeast plants being unnecessary. The most important constituents of grape juice are glucose or grape sugar, and albuminous substances. During fermentation the glucose is converted into alcohol and carbon dioxide gas, the latter escaping in small bubbles. When the first fermentation ceases, the

OF DISTILLED LIQUORS.

Laboratory Number.	Solid Matter in Solution— Per Cent.	Alcohol by Volume— Per Cent.	The indications are that this is—	
			Proof.	
4111	0.67	42.10	83.53	An aged product, proof, reduced with water.
4112	0.05	39.35	78.07	New raw product.
4113	0.76	45.00	89.28	An aged product, proof, reduced with water.
4114	0.07	42.20	83.73	An artificial product.
4115	0.49	41.00	81.35	Whiskey containing some silent spirits and artificial coloring.
4116	0.26	41.75	82.84	Whiskey, new raw alcohol, water and artificial coloring.
4117	0.20	41.60	82.54	Whiskey, silent spirits, water and artificial coloring.
4118	0.56	46.60	92.46	A straight whiskey.
4119	0.31	43.85	87.00	Whiskey, silent spirits, water and artificial coloring.
4120	0.29	36.35	72.12	do.
4121	0.41	42.30	83.93	do.
4122	0.46	41.85	83.03	do.
4123	0.40	35.95	71.33	do.
4124	0.48	46.10	91.40	A straight whiskey.
4125	0.38	43.30	87.10	Whiskey, containing some silent spirits and water.
4127	0.43	39.20	77.77	Whiskey.
4128	0.61	44.80	88.88	Whiskey, containing some water, silent spirits and coloring.
4129	0.18	41.15	83.63	Whiskey, silent spirits, water and artificial coloring.
4130	0.63	37.60	47.70	Straight whiskey.
4131	0.78	49.65	98.51	do.
4132	0.16	42.70	84.72	Whiskey, silent spirits, water and artificial coloring.
4138	0.26	45.00	89.28	Brandy, silent spirits and water.
4139	1.30	45.00	89.28	Brandy.
4140	0.83	47.40	94.05	do.
4144	2.54	34.60	68.65	Gin.
4145	1.42	48.25	95.75	do.
4146	0.05	43.70	86.71	Rum.
4046	0.02	41.70	82.74	An artificial whiskey.

*Sent to the Department by local dealers and others. The brand name and the manufacturer or wholesaler were given by the dealer who sent samples.

period being indicated by the cessation of the escaping gas, to prevent the oxidation of the alcohol to acetic acid the liquid is transferred into casks, in which the slow after-fermentation takes place.

The wine is stored for a time in fresh casks, during which it "ages" and acquires its characteristic flavor.

SAMPLES EXAMINED.

Only 5 samples were examined. They all appeared to be natural wines and no adulteration was found.

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label or as Represented.	Manufacturer or Wholesaler.	Retail Dealer.
4134	Wine, Blackberry, O. N. S. *	Garrett & Co., Norfolk, Va. ----	Dispensary, Henderson, N. C. --
4133	Wine, Scuppernong* -----	---do-----	---do-----
4135	Wine, Blackberry* -----	T. R. Dodson, Hope View, Va.,----	---do-----
4136	Wine, Sherry*-----	Garrett & Co., Norfolk, Va. ----	---do-----
4137	Wine, Sherry, Delicious* -----	J. T. S. Brown & Sons, Louisville, Ky. -----	---do-----

*Sent to the Department by local dealers for analysis.

BITTERS AND TONICS.

A class of products that have found sale in places where alcoholic liquors cannot be sold is a class known as standard remedies or tonics and bitters containing rather a large percentage of alcohol. They are often recommended for quite a variety of diseases, and each has a

RESULTS OF THE DETERMINATION OF ALCOHOL, AND
MATTER IN BIT

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
7204	Rock Rye and Glycerine*-----	The Haynor Mfg. Co., Norfolk, Va.	E. T. Wheeler, Wake Forest, N. C.
4216	La Grippe Specific* -----	Excelsior Medicine Co., Chicago, Ill.	W. S. Weatherspoon, Sanford, N. C.
4217	Buchu Tonic* -----	Haynor Mfg. Co., Norfolk, Va. --	J. F. Morgan, Sanford, N. C.--
4218	Rock Rye and Glycerine*-----	---do-----	---do-----
4229	Buchu Tonic* -----	---do-----	---do-----
4231	Rock Rye and Glycerine*-----	---do-----	E. R. Holt, Sanford, N. C. ----
4232	---do* -----	---do-----	R. E. Smith, Sanford, N. C. ---
3896	Jamaica Ginger Compound*-----	McCormic & Co., Baltimore, Md.	W. T. Williams, Rockingham, N. C.
3897	Essence Jamaica Ginger* -----	L. C. Younger, Richmond, Va.----	---do-----
4500	Checkers* -----	Checkers Medicine Co., Winston-Salem, N. C.	-----
4501	Peruna* -----	Peruna Medicine Co., Columbus, Ohio.	-----
4502	Blackberry Cordial* -----	Pincule Medical Co., Chicago, Ill.	-----
4503	Nectar* -----	E. A. Saunders Sons' Co., Richmond, Va.	-----

WINES—NO ADULTERATION FOUND.

Laboratory Number.	Solid Matter in Solution—Per Cent.	Alcohol by Volume—Per Cent.		The Indications Are that this is—
4134	34.67	14.40	Wine, Blackberry.	
4133	17.41	12.05	Wine, Scuppernong.	
4135	19.56	13.00	Wine, Blackberry.	
4136	4.47	17.40	Wine, Sherry.	
4137	6.33	18.40	do.	

regular dose prescribed, though some of them are not at all uniform in composition.

These samples, 13 in number, all contained alcohol, ranging from 14.50 per cent to 32.20 per cent. No objectionable chemical preservative or coloring matter was found. No effort was made to determine or even detect the medicinal constituents.

EXAMINATION FOR PRESERVATIVES AND COLORING TERS AND TONICS.

Laboratory Number.	Alcohol—Per Cent by Volume.	Solid Matter in Solution—Per Cent.	Adulterants.		Remarks.
			Preservatives.	Objectionable Coloring Matter.	
7204	28.55	15.13	None found -----	None found -----	No effort was made to determine or even detect the medicinal properties.
4216	15.50	5.13	do -----	do -----	
4217	31.95	2.26	do -----	do -----	do.
4218	27.70	5.30	do -----	do -----	do.
4229	32.20	2.25	do -----	do -----	do.
4231	27.70	5.28	do -----	do -----	do.
4232	27.95	5.25	do -----	do -----	do.
3896	23.24	5.44	do -----	do -----	do.
3897	14.50	5.16	do -----	do -----	do.
4500	26.90		do -----	do -----	do.
4501	19.50		do -----	do -----	do.
4502	29.45		do -----	do -----	do.
4503	16.65		do -----	do -----	do.

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THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

LIBRARY
NEW YORK
BOTANICAL
GARDEN

- I. NITRATE OF SODA TESTS WITH COTTON.
 - II. PERUVIAN GUANO-NITRATE OF SODA TESTS WITH COTTON
AND CORN.
 - III. BASIC SLAG TESTS WITH COTTON AND CORN.
 - IV. PHOSPHATE ROCK TESTS WITH COTTON.
-

JANUARY, 1907

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THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 1.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, JANUARY, 1907.

MISCELLANEOUS FERTILIZER TESTS CONDUCTED ON THE DEPARTMENT TEST FARMS DURING 1904, 1905 AND 1906.

BY

C. B. WILLIAMS, FARM CROPS,

AND

G. T. BULLOCK, SUPERINTENDENT EDGECOMBE TEST FARM.

F. T. MEACHAM, SUPERINTENDENT IREDELL TEST FARM.

The results of intelligently planned and carefully conducted field tests with different crops on any type of soil and using different fertilizing mixtures will, when correctly interpreted, afford pretty reliable information as to the immediate fertilizer requirements of the type of soil on which the experiments were carried on. This data, coupled with its history and a knowledge of its total content of the different plant-food constituents, will reveal still more reliable information, not only as to the immediate needs of the soil, but also as to its potentialities and the general cultural and fertilizer treatment that should be given it for different crops.

At the Edgecombe and Iredell farms together, there are at present being conducted each year something like four hundred and fifty fertilizer tests; most of the work up to this time being expended along this line in a study of the fertilizer requirements of corn, cotton, cow-peas, peanuts, and wheat. The results of these tests for the past five years at Edgecombe and the past four years at Iredell are reserved for publication later in the year. At this time only the results of miscellaneous experiments which have been planned primarily to study the relative value of different carriers of nitrogen and phosphoric acid for cotton and corn will be considered. The results with a large number of these also have been reserved for future publication and discussion.

LOCATION AND CHARACTER OF THE SOIL USED FOR THESE TESTS.

Edgecombe Farm.—This farm is in the coastal plain region and is located in Edgecombe County, about midway between the towns of Tarboro and Rocky Mount, and about two miles from Kingsboro, a station on the Atlantic Coast Line Railway.

The soil on which these tests were conducted was a sandy loam, with moderately fine sand, underlaid by a rather tenaceous sandy clay subsoil at a depth, generally, of from 8 to 12 inches. The subsoil is a moderately good sandy clay, such as is found under the larger portion



FIG. 1—Cotton grown at the Edgecombe Farm in the Nitrate of Soda Tests without fertilization.

of the lands of the eastern part of the State. This type of soil responds very readily in remunerative crops to proper fertilization and cultivation, and represents a large and important part of the coastal plain formation, which comprises something like forty per cent of the total area of the State. It is the type of soil designated by the National Bureau of Soils as Norfolk fine sandy loam.

Iredell Farm.—This farm, located in the Piedmont section of the State, lies about one and one-half miles northwest of the corporate limits of Statesville, and is bisected by the Statesville and Western Division of the Southern Railway.

The soil consists of a deep red tenaceous clay soil and subsoil, which is a type covering a large area of the Piedmont Plateau

of this and other South Atlantic States. Generally the only difference between the surface and subsoil in this type of soil is that the former, having been broken up by cultivation and weathering, has more or less vegetable matter worked into it.

This soil is naturally strong, and is susceptible of high productivity under judicious fertilization and proper cultural management. It is especially adapted to the growth of grains, grasses and clover.

PREPARATION AND CULTIVATION OF SOIL FOR CORN.

The plats were all broke alike with a two-horse turning plow 8 to 10 inches deep during January, and then followed by a good harrowing. Just before ready for planting the rows were run 4 to 5 inches deep and 4 feet apart, with a one-horse plow. The fertilizer mixtures for the different plats were applied uniformly in these drills by hand and covered by means of cultivators, having the wings on and straddling the rows. On the slight ridges thus formed the corn was planted a little below the level, all tests of the same kind at the same farm being given the same treatment as to time of planting and otherwise. All cultivations were as nearly level as possible and rather deep early in the season, with the small hoes of the Planet Jr. Cultivator, but became shallower, using the large hoes as the season advanced and the roots extended towards the middle of the rows and nearer the surface. This system of cultivation afforded pretty thorough breaking of the land early in the season and prevented the disturbance of the root systems of the plants later. An effort was made to cultivate every ten or twelve days, as far as the weather would permit, and especially immediately after rains, in order to produce a fine dust mulch with the shallow-running plows, to retard the evaporation of the recently-added moisture.

PREPARATION AND CULTIVATION OF SOIL FOR COTTON.

All plats devoted to these fertilizer tests were broke 8 to 10 inches deep during January or February in the respective years except where otherwise designated at both the Edgecombe and Iredell farms. Just before laying off the rows, which was from the last of April to the middle of May, the ground was "gone over" with a smoothing harrow. The rows were run 5 to 7 inches deep with an 8-inch shovel and the different fertilizer applications per plat made in the furrows thus made. The fertilizer was covered as in the corn, and the cotton planted on the level or slightly above the level. One or two cultivations were given the cotton before it came up, using a weeder or light harrow, depending upon which did the most effective and satisfactory work.

The cultivation was level with cultivators, being moderately deep at the beginning of the season and shallower as the root zone increased. The cultivator was never run more than twice to the row

at a time, as this more than covered the middle, and an effort was made to work over the plats as quickly as possible immediately after rains to break the crust formed by the showers and leave a dust mulch to check evaporation. The cultivator was run about $1\frac{1}{2}$ to 2 inches deep toward the close of the season. It was attempted to cultivate every ten days, which had to be changed, of course, to suit the season.

FERTILIZING MATERIALS.

The composition of the fertilizing materials used in these tests were as follows:

Peruvian Guano.—The Lobos type was used, which contained on an average of 22.49 per cent of total phosphoric acid; 3.18 per cent of nitrogen; and 4.33 per cent of potash. It was found by laboratory methods that about half of the total phosphoric acid was in an available form.

Acid Phosphate.—This material is made by treating finely-ground phosphate rock with oil of vitriol (sulphuric acid). The acid phosphate used contained 16.86 per cent of total phosphoric acid; 14.29 per cent available phosphoric acid; 12.48 per cent of water-soluble phosphoric acid, and 2.57 per cent of insoluble phosphoric acid.

Kainit.—This is a crude potash salt, which is mined in North Germany. The average composition of the kainit used was 12.01 per cent of potash. This material also contained from 30 to 40 per cent of common salt.

Manure Salt.—This material is also derived from the potash mines of Germany. The manure salt used contained on an average of 19.68 per cent of potash, the potash being chiefly in the form of muriate.

Nitrate of Soda.—This material is mined in Chili. The nitrate used contained 15.16 per cent of nitrogen which is in a readily available form for direct use by growing plants.

Dried Blood is a by-product of slaughter-house establishments. Its nitrogen is as available or more so than that of cotton-seed meal. The blood used was of a high grade and contained an average of 13.14 per cent of nitrogen.

Cotton-seed Meal.—The cotton-seed meal used contained 6.67 per cent of nitrogen and about 2.80 per cent of total phosphoric acid and 1.80 per cent of potash.

Basic or Thomas Slag.—It is a by-product obtained in the manufacture of steel by the modified Bessemer process. The lot of this phosphatic material which was used in the experiments that follow contained an average content of 16.23 per cent of total phosphoric acid and 9.04 per cent of insoluble phosphoric acid.

Ground Phosphate Rock.—The brown Mount Pleasant rock ground to a fineness so that 90 per cent would pass through a 60-mesh screen

was the rock used in these experiments. It contained 28.95 per cent of total phosphoric acid.

I. NITRATE OF SODA TESTS WITH COTTON.

PLAN OF EXPERIMENTS.

These experiments were designed especially to study the action and suitability of nitrate of soda as a carrier of nitrogen to the cotton crop. They were conducted at the Edgcombe farm on seven one-tenth acre plats, which were carefully staked off on a piece of land of moderately uniform character throughout. The plats followed each other with an unfertilized row between the plats.

Plat 1 was left without fertilization of any kind, while plat 2 was given during both years an application of 20.0 pounds of acid phosphate and 8.3 pounds of kainit or its equivalent of potash in the form of manure salt. The remaining plats have received in addition to acid phosphate and kainit (or manure salt) annual applications of nitrate of soda to each in varying amounts and divided differently; part being added just before planting the seed, and the remainder being reserved and applied as a side-dressing the latter part of June in 1905, and the latter part of July, in 1906. In addition to acid phosphate, kainit or manure salt and nitrate of soda plat 7 has also received an application of dried blood at planting at the rate of 40 pounds per acre. These experiments have been conducted two years, and the individual plats during this time have each occupied the same land and received the identical application applied in the same way both years. The cotton was planted at the rate of one bushel per acre in rows 3 feet 4 inches apart, using seed of King's Improved variety for planting. When the plants had attained sufficient height, they were reduced to and maintained as nearly as possible at a stand of one plant to every fifteen inches in the row. The perfectness of the stand in the several plats during 1905 and 1906 is shown in Tables I and II by comparing the figures contained in the fourth with those recorded in the third column. The soil at the Edgcombe farm devoted to these tests was on the poorer phase of the type of soil of the farm and was rather in a run-down condition and contained relatively only a small quantity of humus.

TABLE I—RESULTS OF NITRATE OF
EDGECOMBE

Number Plat.	Fertilizer Application per Acre.	Number Stalks per Plat.		Yield in Pounds per Plat.			
		For Perfect Stand.	By Actual Count.	First Picking— September 28.	Second Picking— November 8.	Third Picking— January 19.	Total Pickings.
1	Nothing -----	1,045	787	36.50	30.50	1.50	68.50
2	{ 200 pounds acid phosphate----- } { 83 pounds kainit ----- }	1,045	887	69.00	39.50	3.25	111.75
3	{ 200 pounds acid phosphate----- } { 83 pounds kainit ----- } { 75 pounds nitrate of soda ¹ ----- }	1,045	868	105.00	54.00	5.50	164.50
4	{ 200 pounds acid phosphate----- } { 83 pounds kainit ----- } { 100 pounds nitrate of soda ² ----- }	1,045	887	102.00	70.00	7.50	179.50
5	{ 200 pounds acid phosphate----- } { 83 pounds kainit ----- } { 125 pounds nitrate of soda ³ ----- }	1,045	793	103.00	66.50	8.00	177.50
6	{ 200 pounds acid phosphate----- } { 83 pounds kainit ----- } { 100 pounds nitrate of soda ⁴ ----- }	1,045	817	93.00	44.00	2.50	139.50
7	{ 200 pounds acid phosphate----- } { 83 pounds kainit ----- } { 40 pounds dried blood ----- } { 75 pounds nitrate of soda ¹ ----- }	1,045	880	105.00	31.50	2.25	138.75

¹ 25 pounds of the nitrate of soda applied with other materials at planting on April 28 and remaining 50 pounds of nitrate applied as a side-dressing on June 28.

² 25 pounds of the nitrate of soda applied with other materials at planting on April 28 and remaining 75 pounds of nitrate applied as a side-dressing on June 28.

³ 25 pounds of the nitrate of soda applied with other materials at planting on April 28 and remaining 100 pounds of nitrate applied as a side-dressing on June 28.

⁴ 50 pounds of the nitrate of soda applied with other materials at planting on April 28 and remaining 50 pounds of nitrate applied as a side-dressing on June 28.

SODA TESTS WITH COTTON IN 1905.

FARM.

Total Pounds Seed Cotton per Acre.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 11 Cents per Pound.	Value of Seed per Acre at 80 Cents per Hundred Pounds or 24 Cents per Bushel.	Total Value of Lint and Seed per Acre.	Cost of Fertilizer per Acre.	Value of Increase—		
							Over Cost of Fer- tilizer Applied per Acre.	Ranking the Unfer- tilized Plat (No. 1) at 1.00.	Ranking of the Plat (No. 2) Fertilized Only with Phos- phoric Acid and Potash at 1.00.
685.0	261.74	423.26	\$ 28.79	\$ 3.39	\$ 32.18	\$ 0.00	\$ 32.18	1.00	-----
1,117.5	427.00	690.50	46.97	5.52	52.49	1.98	50.51	1.57	1.00
1,645.0	623.55	1,016.45	69.14	8.13	77.27	3.83	73.44	2.28	1.46
1,795.0	685.87	1,109.13	75.45	8.87	84.32	4.48	79.84	2.48	1.58
1,775.0	678.23	1,096.77	74.61	8.77	83.38	5.11	78.27	2.43	1.55
1,395.0	533.03	861.97	58.63	6.90	65.53	4.48	61.05	1.90	1.21
1,387.5	530.16	857.34	58.32	6.86	65.18	5.03	60.15	1.87	-----

TABLE II—RESULTS OF NITRATE OF
EDGEcombe

Number Plat.	Fertilizer Application per Acre.	Number Stalks per Plat.		Average Height of Stalks in Inches at Maturity.	Yield in Pounds per Plat.		
		For Perfect Stand.	By Actual Count.		First Picking— September 12.	Second Picking— December 4.	Total Pickings.
1	Nothing-----	1,045	850	27	29.0	37.0	66.0
2	{ 200 pounds acid phosphate----- 50 pounds manure salt ----- }	1,045	846	29	31.0	74.0	105.0
3	{ 200 pounds acid phosphate----- 50 pounds manure salt ----- 75 pounds nitrate of soda ¹ ----- }	1,045	788	38	42.0	105.0	147.0
4	{ 200 pounds acid phosphate----- 50 pounds manure salt ----- 100 pounds nitrate of soda ² ----- }	1,045	716	38	48.0	98.0	146.0
5	{ 200 pounds acid phosphate----- 50 pounds manure salt ----- 125 pounds nitrate of soda ³ ----- }	1,045	816	39	47.0	82.0	129.0
6	{ 200 pounds acid phosphate----- 50 pounds manure salt ----- 100 pounds nitrate of soda ⁴ ----- }	1,045	761	32	56.0	52.0	108.0
7	{ 200 pounds acid phosphate----- 50 pounds manure salt ----- 40 pounds dried blood ----- 75 pounds nitrate of soda ¹ ----- }	1,045	794	35	37.0	45.0	82.0

¹ 25 pounds of nitrate of soda applied with other materials at planting on May 1, and remaining 50 pounds of nitrate applied as a side-dressing on July 27.

² 25 pounds of nitrate of soda applied with other materials at planting on May 1, and remaining 75 pounds of nitrate applied as a side-dressing on July 27.

³ 25 pounds of nitrate of soda applied with other materials at planting on May 1, and remaining 100 pounds of nitrate applied as a side-dressing on July 27.

⁴ 50 pounds of nitrate of soda applied with other materials at planting on May 1, and remaining 50 pounds of nitrate applied as a side-dressing on July 27.

SODA TESTS WITH COTTON IN 1906.

FARM.

Total Pounds Seed Cotton per Acre.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 10 Cents per Pound.	Value of Seed per Acre at \$1.00 per 100 Pounds or 30 Cents per Bushel.	Total Value of Lint and Seed per Acre.	Cost of Fertilizer per Acre.	Value of Increase—		
							Over Cost of Ferti- lizer Applied per Acre.	Ranking Unferti- lized Plat at 1.00.	Ranking Plat Fer- tilized Only with Phosphoric Acid and Potash at 1.00.
660.0	231.5	428.5	\$ 23.15	\$ 4.29	\$ 27.44	\$ 0.00	\$ 27.44	1.00	-----
1,050.0	368.3	681.7	36.83	6.82	43.65	1.90	41.75	1.52	1.00
1,470.0	515.7	954.3	51.57	9.54	61.11	3.78	57.33	2.09	1.37
1,460.0	512.2	947.8	51.22	9.48	60.70	4.40	56.30	2.05	1.35
1,290.0	452.5	837.5	45.25	8.38	53.63	5.03	48.60	1.77	1.16
1,080.0	378.09	701.1	37.89	7.01	44.90	4.40	40.50	1.48	.97
820.0	287.7	532.3	28.77	5.32	34.09	4.98	29.11	1.06	-----

TABLE III—AVERAGE RESULTS OF TWO YEARS' TESTS WITH NITRATE OF SODA ON COTTON.

EDGEcombe FARM.

Number Plat.	Fertilizer Application per Acre. ¹	Value of Increase in Pounds per Acre of Total Products (Lint and Seed).				
		Over Cost of Fertilizer.	In Excess of Unfertilized Plat (No. 1).	In Excess of Plat (No. 2), Fertilized with Phosphoric Acid and Potash Alone.	Ranking Unfertilized Plat (No. 1) at 1.00.	Ranking Plat (No. 2), Fertilized only with Phosphoric Acid and Potash, at 1.00.
1	Nothing -----	\$ 29.81	\$ -----	— \$ 16.32	1.00	.65
2	{ 200 pounds acid phosphate ----- 83 pounds kainit. ----- }	46.13	16.32	-----	1.55	1.00
3	{ 200 pounds acid phosphate ----- 83 pounds kainit. ----- 75 pounds nitrate of soda ² ----- }	65.39	35.58	19.26	2.19	1.42
4	{ 200 pounds acid phosphate ----- 83 pounds kainit. ----- 100 pounds nitrate of soda ³ ----- }	68.07	38.26	21.94	2.28	1.48
5	{ 200 pounds acid phosphate ----- 83 pounds kainit. ----- 125 pounds nitrate of soda ⁴ ----- }	63.44	33.63	17.31	2.13	1.38
6	{ 200 pounds acid phosphate ----- 83 pounds kainit. ----- 100 pounds nitrate of soda ⁵ ----- }	50.78	20.97	4.65	1.70	1.10
7	{ 200 pounds acid phosphate ----- 83 pounds kainit. ----- 40 pounds of dried blood ----- 75 pounds of nitrate of soda ⁶ ----- }	44.63	14.82	— 1.50	1.50	.97

NOTE—In the above table minus (—) means loss of the amounts indicated.

¹ In 1906, instead of using kainit as a source of potash, manure salt was applied, adding sufficient to supply the exact amount of actual potash represented by the pounds of kainit given below in the respective plats.² 25 pounds of nitrate of soda applied with other materials at planting on April 28 in 1905, and May 1 in 1906, and remaining 50 pounds applied as a side-dressing on June 28 in 1905, and July 27 in 1906.³ 25 pounds of nitrate of soda applied with other materials at planting on April 28 in 1905, and May 1 in 1906, and remaining 75 pounds applied as a side-dressing on June 28 in 1905, and July 27 in 1906.⁴ 25 pounds of nitrate of soda applied with other materials at planting on April 28 in 1905, and May 1 in 1906, and remaining 125 pounds applied as a side-dressing on June 28 in 1905, and July 27 in 1906.⁵ 50 pounds of nitrate of soda applied with other materials at planting on April 28 in 1905, and May 1 in 1906, and remaining 50 pounds applied as a side-dressing on June 28 in 1905, and July 27 in 1906.

RESULTS OF NITRATE OF SODA TESTS.

In 1905, Plats 4, 5 and 3, in the order given, produced the highest yields and greatest clear profit over cost of fertilizers; while in 1906, Plats 3, 4 and 5 were the largest producing plats of seed cotton as well as the most profitable ones. It will be noticed that the same three plats in the two years' tests are the largest and most profitable yielders, but the order of yields and profits is different in the different years. As an average of the two years' results, the most profitable application was that given to Plat 4 (see Fig. 2), receiving 200 pounds



FIG. 2—Cotton grown at Edgecombe Farm and fertilized with 200 pounds of Acid Phosphate, 50 pounds of Manure Salt and 75 pounds of Nitrate of Soda; 25 pounds of the Nitrate going in with other materials at planting, and the remaining 50 pounds of Nitrate applied as a side-dressing on July 27.

of acid phosphate, 83 pounds of kainit and 100 pounds of nitrate of soda, 25 pounds of the nitrate being applied with other materials at planting and the remaining 75 pounds reserved and used as a side-dressing June 28 in 1905 and July 27 in 1906. The applications received by Plats 3 and 5 were close second and third. It is very striking, as seen in Table III, that the plat (No. 1) to which no fertilizer was applied is the one in both years that gave decidedly the smallest clear profit. The selling price of total products (lint and seed) from this plat averaged \$16.32 less profit than those from Plat 2, receiving 200 pounds of acid phosphate and 83 pounds of kainit per

acre; and from \$14.82 to \$35.58 less clear profit per acre than the different plats receiving applications of nitrate of soda. In other words, stating the average of the two years' results differently, it is seen by data contained in the sixth column of Table III that the plat (No.4) fertilized at the rate per acre of 200 pounds of acid phosphate, 83 pounds of kainit and 100 pounds of nitrate of soda (25 pounds of the nitrate being applied with the acid phosphate and kainit at planting and the remaining 75 pounds being used as a side-dressing later in the season) was over two and one-quarter times as profitable as the unfertilized plat. The other plats, receiving normal applications of phosphoric acid and potash with nitrate of soda in different quantities and applied in different ways, were on an average from one and one-half to almost two and two-tenths more profitable than the plat without fertilization. Column five of Table III shows that the clear profits from Plats 4, 3 and 5 were respectively \$21.94, \$19.26 and \$17.31 more per acre than from the plat (No. 2) receiving only acid phosphate and kainit. As this later received exactly the same amount of acid phosphate and kainit as Plats 4, 3 and 5, it seems only fair to accredit this increased profit to the judicious use of nitrate of soda. Column seven, Table III, shows that the profit from Plats 4, 3 and 5 were 1.48, 1.42 and 1.38 more respectively than from Plat 2 receiving 200 pounds of acid phosphate and 83 pounds of kainit per acre. For some reason the nitrate of soda and dried blood used on Plat 7 seem to have done no good, as the yield of this plat is just about the same as the plat (No. 2) receiving only acid phosphate and kainit. (See Fig. 3). Notwithstanding this fact, Plat 7 produced \$14.82 more profit per acre than the unfertilized plat.

The profit from all the plats was larger in 1905 than in 1906, due most likely to the extremely unfavorable season, during both the growing and maturing of the cotton, that prevailed in 1906.

CONCLUSIONS.

The tentative conclusion, drawn from these two years' tests with cotton conducted on the sandy loam soil of the Edgecombe farm, is that all of the different combinations of fertilizing materials employed were profitable ones; but that the best one, because the most profitable, on an average, of the seven tests tried during the two years was an application consisting of 200 pounds of acid phosphate, 83 pounds of kainit and 100 pounds of nitrate of soda per acre, the nitrate application being divided and 25 pounds of it going in the soil with the acid phosphate and kainit just before planting the cotton,

and the remaining 75 pounds of nitrate reserved for a side-dressing during July, the total costing on an average of \$4.44 per acre. Applications of 75 pounds and 125 pounds of nitrate of soda respectively with 200 pounds of acid phosphate and 83 pounds of kainit per acre were also quite profitable ones, when 25 pounds each of the 75 and 125 pounds of nitrate were applied just before planting with the other materials and the remainder reserved and applied as a side-dressing during the latter part of June or July.

As nitrate of soda is readily soluble in water, it will stand in great danger of being leached from the soil and lost if proper precautions are not observed in its use. To handle it in such a way as to guard against such a loss with general farm crops it should all be reserved for a side-dressing to the growing plants, or else the applications should be divided, applying part at or just before planting and reserving the remaining portion and using it as a side-dressing for the cotton when or just before the plants have begun to bloom.

II. PERUVIAN GUANO—NITRATE OF SODA TESTS WITH COTTON AND CORN.

PLAN OF EXPERIMENTS.

These experiments have been conducted primarily to ascertain the relative value of Peruvian guano as a fertilizing material for cotton and corn as compared with varying mixtures of acid phosphate, kainit (or manure salt) and nitrate of soda. Peruvian guano is a manurial product that is now finding its way into our markets in moderately large quantities, hence its relative fertilizing value as compared with the better known materials is a matter that should prove of considerable interest and importance to farmers of the State. The plats devoted to each of these tests have varied from one-tenth to one acre in size in the different years at the different farms.

Most commonly, however, the plats have ranged from three-quarters to an acre in extent. The cotton and corn were planted at the different farms in the different years from April 26 to May 15, the cotton being put in 3 1-3 feet rows and the corn in 4 feet rows. In the cotton tests King's Improved seed were used at Iredell and Culpepper's Improved at Edgecombe; while in the corn work Weekley's Improved at Iredell and Coeke's Improved at Edgecombe were planted.

Thirty pounds (one bushel) of cotton seed and nine pounds of shelled corn were planted per acre, and the cotton reduced to a stand of 15 inches and the corn to that of 30 inches in the row. In all cases in all these tests, where not otherwise specified, the fertilizers or fer-

tilizing mixtures were applied in the drill just before planting. This was done by opening the rows and applying carefully the weighed amounts designated for the different plats. Then this was covered by means of a cultivator, straddling the open furrow, going once to the row and making a small ridge just over the fertilizer. On this ridge the seed were planted, using a planter for both cotton and corn.

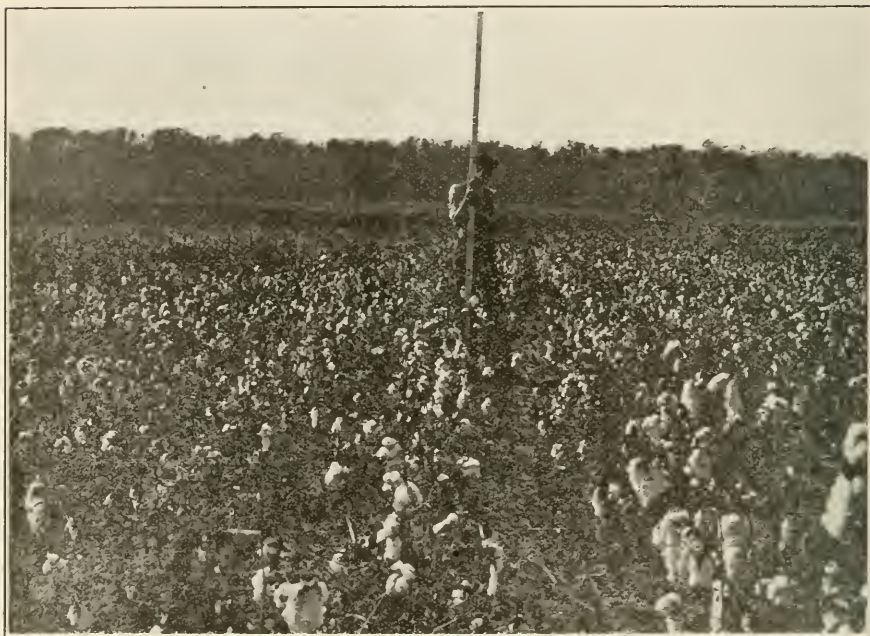


FIG. 3—Cotton grown at the Edgecombe Farm in the Nitrate of Soda Tests and receiving an application of 200 pounds of Acid Phosphate and 50 pounds of Manure Salt.

The land used for the corn tests at the Edgecombe farm has been given over to a rotation of corn and crimson clover, the crimson clover being sowed between the corn rows and harrowed in during the latter part of August. After the corn was cut off during September the clover had possession of the land until it bloomed in the spring, when it was plowed in and corn planted. The growth of clover has never been very large. This short rotation has now been running some three or four years.

TABLE IV—RESULTS OF PERUVIAN GUANO-NITRATE OF SODA TESTS
WITH COTTON IN 1904.

EDGECOMBE FARM.

Number Plat.	Fertilizer Application per Acre.	Yield of Seed Cotton in Pounds per Acre.	Value of Seed Cotton, Allowing 4 Cents per Pound.	Cost of Fertilizer per Acre.	Value of Increase Over Cost of Fertilizer.
1	300 pounds of Peruvian guano -----	1,259.50	\$ 50.38	\$ 5.25	\$ 45.13
2	500 pounds of Peruvian guano -----	1,450.50	58.02	8.75	49.27
3	{ 200 pounds of acid phosphate ----- 85 pounds of kainit ----- 100 pounds of nitrate of soda ¹ ----- }	1,174.00	46.96	4.41	42.55
4	{ 200 pounds of acid phosphate ----- 85 pounds of kainit ----- 100 pounds of nitrate of soda ² ----- }	1,142.00	45.68	4.41	41.27
5	{ 200 pounds of acid phosphate ----- 85 pounds of kainit ----- 150 pounds of nitrate of soda ³ ----- }	1,570.50	62.82	5.66	57.16

¹ 50 pounds of nitrate applied at planting with other materials; other 50 pounds of nitrate applied as a side-dressing about July 1.² All the nitrate on this plat was applied with other materials at planting.³ 100 pounds of nitrate applied at planting with other materials; other 50 pounds of nitrate applied as a side-dressing about July 1.TABLE V—RESULTS OF PERUVIAN GUANO-NITRATE OF SODA TESTS
WITH COTTON IN 1904.

IREDELL FARM.

Number Plat.	Fertilizer Application per Acre.	Yield of Seed Cotton in Pounds per Acre.	Value of Seed Cotton, Allowing 4 Cents per Pound.	Cost of Fertilizer per Acre.	Value of Increase—	
					Over Cost of Fertilizer.	Ranking Plat (No. 6) Receiving Normal Application of Fertilizer at 1.00.
1	300 pounds of Peruvian guano -----	812.00	\$ 32.48	\$ 5.25	\$ 27.23	.73
2	500 pounds of Peruvian guano -----	905.33	36.21	8.75	27.46	.73
3	{ 200 pounds of acid phosphate ----- 50 pounds of manure salt ----- 100 pounds of nitrate of soda ¹ ----- }	930.67	37.23	4.40	32.83	.84
4	{ 200 pounds of acid phosphate ----- 50 pounds of manure salt ----- 100 pounds of nitrate of soda ² ----- }	836.00	33.44	4.40	29.04	.77
5	{ 200 pounds of acid phosphate ----- 50 pounds of manure salt ----- 150 pounds of nitrate of soda ³ ----- }	889.33	35.58	5.65	29.93	.80
6	{ 200 pounds acid phosphate ----- 50 pounds of manure salt ----- 75 pounds of dried blood ----- }	1,042.67	41.71	4.23	37.48	1.00

¹ All the nitrate of soda applied with other materials just before planting on April 27.² 50 pounds of nitrate applied with other materials on April 27; other 50 pounds used as a side-dressing and applied about June 20.³ 100 pounds of nitrate applied with other materials on April 27; other 50 pounds used as a side-dressing and applied about June 20.

TABLE VI—RESULTS OF PERUVIAN GUANO EXPERIMENTS WITH COTTON IN 1906.

EDGECOMBE FARM.

Number Plat.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield of Seed Cotton in Pounds per Acre.	Value of Seed Cotton, Allowing 4 Cents per Pound.	Cost of Fertilizer per Acre.	Value of Increase—	
						Over Cost of Fertilizer.	Ranking Plat (No. 3) Receiving Normal Application of Fertilizer at 1.00.
1	300 pounds Peruvian guano-----	-----	641.25	\$25.65	\$ 5.25	\$ 20.40	.80
2	500 pounds Peruvian guano-----	-----	670.55	26.82	8.75	18.07	.71
3	{ 200 pounds acid phosphate----- } { 50 pounds manure salt----- } { 75 pounds dried blood----- }	-----	743.85	29.75	4.15	25.60	1.00
4	{ 300 pounds Peruvian guano----- } { 25 pounds nitrate of soda----- }	-----	754.20	30.17	5.88	24.29	.95

TABLE VII—RESULTS OF PERUVIAN GUANO EXPERIMENTS WITH COTTON IN 1906.

IREDELL FARM.

Number Plat.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield of Seed Cotton in Pounds per Acre.	Value of Seed Cotton, Allowing 4 Cents per Pound.	Cost of Fertilizer per Acre.	Value of Increase—		
						Over Cost of Fertilizer.	Ranking Unfertilized Plat (No. 5) at 1.00.	Ranking Plat (No. 3) Receiving Normal Application of Fertilizer at 1.00.
1	300 pounds Peruvian guano-----	-----	770.00	\$30.80	\$5.25	\$ 25.55	1.64	.85
2	500 pounds Peruvian guano-----	-----	792.50	31.70	8.75	22.95	1.47	.77
3	{ 200 pounds acid phosphate -- } { 50 pounds manure salt ----- } { 75 pounds dried blood----- }	-----	852.05	34.10	4.15	29.95	1.92	1.00
4	{ 300 pounds Peruvian guano-- } { 25 pounds nitrate of soda-- }	-----	880.00	35.20	5.88	29.32	1.88	.98
5	Nothing-----	-----	390.00	15.60	-----	15.60	1.00	.52

TABLE VII—AVERAGE RESULTS OF TWO YEARS' TESTS WITH PERUVIAN GUANO AND NITRATE OF SODA ON COTTON.

Number Plat.	Fertilizer Application per Acre.	Value of Increased Yield of Seed Cotton Over Cost of Fertilizer.					
		Edgecombe Farm.			Iredell Farm.		
		1904.	1906.	Averages.	1904.	1906.	Averages.
1	300 pounds of Peruvian guano -----	\$45.13	\$20.40	\$ 32.77	\$27.23	\$25.55	\$ 26.39
2	500 pounds of Peruvian guano -----	49.27	18.07	33.67	27.46	22.95	25.21
3	{ 300 pounds of Peruvian guano ----- } { 25 pounds of nitrate of soda ----- }	-----	24.29	-----	-----	29.32	-----
4	{ 200 pounds of acid phosphate ----- } { 50 pounds of manure salt ----- } { 75 pounds of dried blood ----- }	-----	25.60	-----	37.48	29.95	33.72
5	Nothing -----	-----	-----	-----	-----	15.60	-----
6	{ 200 pounds of acid phosphate ----- } { 50 pounds of manure salt ¹ ----- } { 100 pounds of nitrate of soda ² ----- }	42.55	-----	-----	29.04	-----	-----
7	{ 200 pounds of acid phosphate ----- } { 50 pounds of manure salt ¹ ----- } { 100 pounds of nitrate of soda ³ ----- }	41.27	-----	-----	32.88	-----	-----
8	{ 200 pounds of acid phosphate ----- } { 50 pounds of manure salt ¹ ----- } { 150 pounds of nitrate of soda ⁴ ----- }	57.16	-----	-----	29.93	-----	-----

¹ In 1904, 85 pounds of kainit was applied instead of 50 pounds of manure salt; but the actual amount of potash in both were identical, hence the applications are taken as the same.

² 50 pounds of the nitrate applied at planting with other materials; and the other 50 pounds of nitrate applied as a side-dressing about July 1.

³ All nitrate applied with other materials at planting.

⁴ 100 pounds of the nitrate applied at planting with other materials; and the other 50 pounds of nitrate applied as a side-dressing about July 1.

RESULTS OF PERUVIAN GUANO-NITRATE OF SODA TESTS WITH COTTON.

Results of 1904.—At the Edgecombe farm the most profitable application was one consisting of 200 pounds of acid phosphate, 85 pounds of kainit and 150 pounds of nitrate of soda per acre, this giving a gain over cost of fertilizer applied of \$57.16 per acre. On this plat the nitrate application was divided and applied at the rate of 100 pounds per acre with other materials just before planting, and the remaining quantity being applied as a side-dressing about the first of July.

The plats receiving applications of Peruvian guano were the next two most profitable ones, as is shown in Table IV, where 500 and 300 pounds of Peruvian guano yielded respectively profits of \$49.27 and \$47.13 per acre over cost of fertilizer.

At the Iredell farm during this year, as seen by Table V, the application producing the largest clear gain was one made up of 200 pounds of acid phosphate, 50 pounds of manure salt and 75 pounds of dried blood per acre, and applied in the drill just before planting. An application of 200 pounds of acid phosphate, 50 pounds of ma-

nure salt and 100 pounds of nitrate of soda per acre, all placed in the drill just before planting, was second most profitable at this farm, with an increment of gain over cost of fertilizer of \$32.83. Two hundred pounds of acid phosphate, 50 pounds of manure salt and 150 pounds of nitrate of soda, 100 pounds of the nitrate being applied with other materials on April 27, just before planting, and the remaining 50 pounds used as a side-dressing and applied about June 20, gave a clear profit of \$29.93; while the same application of acid phosphate and manure salt with 50 pounds of nitrate at planting, followed by a side-dressing of 50 pounds of nitrate during the latter



FIG. 4—Cotton grown at Iredell Farm and fertilized with 200 pounds of Acid Phosphate, 50 pounds of Manure Salt and 75 pounds of Dried Blood.

part of June, produced a clear gain of \$29.04. Applications of 500 and 300 pounds of Peruvian guano gave profits of \$27.46 and \$27.26 respectively in excess of cost of guano.

Results of 1906.—The most favorable application, as seen by Table VI, during this year at the Edgecombe farm was one producing a profit of \$25.60 and consisting of 200 pounds of acid phosphate, 50 pounds of manure salt and 75 pounds of dried blood per acre. The next most profitable was the plat fertilized just before planting with 300 pounds of Peruvian guano and 25 pounds of nitrate of soda. Applications of 300 and 500 pounds per acre at this farm this year yielded profits of \$20.40 and \$18.07 respectively in excess of

cost of guano. At Iredell, the most profitable ones were applications of 200 pounds of acid phosphate, 50 pounds of manure salt and 75 pounds of dried blood (see Fig. 4), and 300 pounds of Peruvian guano with 25 pounds of nitrate of soda per acre just before planting. The gains from these applications were \$14.35 and \$13.72 per acre respectively in excess of the unfertilized plat (see Fig. 5). Applications of 300 and 500 pounds of Peruvian guano per acre at this farm this year produced respectively profits of \$9.95 and \$7.35 in excess of the plat without fertilization. It is very significant that an application of 200 pounds of acid phosphate, 50 pounds of manure salt and 75 pounds of dried blood; and 300 pounds Peruvian guano and 25 pounds of nitrate of soda per acre each, produced almost twice the clear profit of the unfertilized plat, as is shown by results contained in the last column of Table VII. Three hundred pounds of Peruvian guano alone per acre produced 1.6 times the profit of the plat without fertilization.

CONCLUSIONS.

Of course from two years' results only tentative inferences can safely be made, as experimental work of this nature should be carefully conducted at least four or five years before attempting to draw anything like definite conclusions. Results of one or two years' work, however, are frequently strongly indicative of what the available fertilizer deficiencies of the soil are.

Taking the compiled results obtained during 1904 and 1906 at the Edgecombe and Iredell farms it appears evident as seen by results contained in Table VIII—

(1) That with cotton, all the fertilizer applications used in these experiments were profitable investments.

(2) That a mixture of 200 pounds of acid phosphate, 50 pounds of manure salt and 75 pounds of dried blood per acre gave more remunerative returns than any of the other fertilizing materials or combinations used.

(3) That 300 pounds of Peruvian guano and 25 pounds of nitrate of soda per acre applied just before planting was very little indeed below in value the mixture given above in producing clear profit.

(4) That the use of nitrate of soda in conjunction with Peruvian guano is advisable, as is shown by 25 pounds of it increasing in 1906 the profit on the use of 300 pounds of Peruvian guano by \$3.89 at Edgecombe and \$3.77 at Iredell.

(5) That the judicious use of nitrate of soda on cotton up to 150 pounds per acre is indicated to be a profitable investment, on soils of the character represented by the Edgecombe and Iredell farms.

(6) That the use of Peruvian guano on cotton pays well as a fertilizing material, at its present price per ton, either alone or in conjunction with nitrate of soda, when applied to the land at or just before planting.

TABLE IX—RESULTS OF PERUVIAN GUANO-NITRATE OF SODA TESTS WITH CORN IN 1904.

IREDELL FARM.

Number Plat.	Fertilizer Application per Acre.	Yield in Bushels of Shelled Corn per Acre.	Value of Corn at 60 Cents per Bushel.	Cost of Fertilizer per Acre.	Value of Corn per Acre Over Cost of Fertilizer.
1	200 pounds Peruvian guano-----	17.6	\$ 10.56	\$ 3.50	\$ 7.06
2	400 pounds Peruvian guano-----	13.7	8.22	7.00	1.22
3	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 50 pounds of nitrate of soda ¹ ----- }	17.8	16.86	2.52	8.16
4	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 100 pounds of nitrate of soda ¹ ----- }	21.6	12.96	3.77	9.19
5	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 100 pounds of nitrate of soda ² ----- }	17.8	10.68	3.77	6.91
6	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 70 pounds of dried blood----- }	14.8	8.88	3.37	5.51

¹ The nitrate of soda was applied on these plats with other materials just before planting.² 50 pounds of the nitrate of soda applied with other materials at planting on April 26, and remaining 50 pounds of nitrate applied as a side-dressing on June 20.TABLE X—RESULTS OF NITRATE OF SODA TESTS ON CORN IN 1905.¹

IREDELL FARM.

Number Plat.	Fertilizer Application per Acre.	Yield in Bushels of Shelled Corn per Acre.	Value of Corn at 60 Cents per Bushel.	Cost of Fertilizer per Acre.	Value of Corn per Acre Over Cost of Fertilizer.
1	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 50 pounds of nitrate of soda ² ----- }	29.1	\$ 17.46	\$ 2.52	\$ 14.94
2	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 100 pounds of nitrate of soda ² ----- }	34.0	20.40	3.77	16.63
3	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 100 pounds of nitrate of soda ³ ----- }	36.8	22.08	5.02	17.06
4	{ 125 pounds of acid phosphate----- } { 135 pounds of cotton-seed meal----- }	26.6	15.96	2.56	13.40

¹ This is part of the Peruvian guano-nitrate of soda tests, the Peruvian guano being left out this year because of inability to get it in time to apply to the corn before planting.² All the nitrate of soda in these two plats was added with other materials just before planting.³ 50 pounds of nitrate of soda applied with other materials at planting on May 15, and remaining 50 pounds of nitrate used as a side-dressing on June 27.

TABLE XI—RESULTS OF TESTS OF PERUVIAN GUANO-NITRATE OF SODA WITH CORN IN 1906.

IREDELL FARM.

Number Plat.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield in Bushels of Shelled Corn per Acre.	Value of Corn at 60 Cents per Bushel.	Cost of Fertilizer per Acre.	Value of Increase—	
						Over Cost of Fertilizer.	Ranking Unfertilized Plat (No. 4) at 1.00.
1	200 pounds Peruvian guano-----	-----	24.3	\$14.58	\$ 3.50	\$11.08	1.20
2	400 pounds Peruvian guano-----	-----	27.2	16.32	7.00	9.32	1.01
3	{ 150 pounds acid phosphate----- 25 pounds manure salt----- 50 pounds nitrate of soda ¹ ----- }	-----	22.0	13.20	2.55	10.65	1.15
4	Nothing-----	-----	15.4	9.24	-----	9.24	1.00
5	{ 150 pounds acid phosphate----- 25 pounds manure salt----- 100 pounds nitrate of soda ² ----- }	-----	27.7	16.62	3.80	12.82	1.39

¹ Nitrate of soda applied with other materials just before planting.² 25 pounds of nitrate of soda was applied with other materials on May 9; and remaining 75 pounds of nitrate applied as a side-dressing on June 16.

TABLE XII—RESULTS OF TESTS OF PERUVIAN GUANO-NITRATE OF SODA IN CORN IN 1906.

EDGECOMBE FARM.

Number Plat.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield in Bushels of Shelled Corn per Acre.	Value of Corn at 60 Cents per Bushel.	Cost of Fertilizer per Acre.	Value of Increase—	
						Over Cost of Fertilizer.	Ranking Unfertilized Plat (No. 4) at 1.00.
1	200 pounds Peruvian guano-----	-----	16.4	\$ 9.84	\$ 3.50	\$ 6.34	.67
2	400 pounds Peruvian guano-----	-----	15.2	9.12	7.00	2.12	.23
3	{ 150 pounds acid phosphate----- 25 pounds manure salt----- 50 pounds nitrate of soda ¹ ----- }	-----	14.3	8.58	2.55	6.03	.64
4	Nothing-----	-----	15.7	9.42	-----	9.42	1.00
5	{ 150 pounds acid phosphate----- 25 pounds manure salt----- 100 pounds nitrate of soda ¹ ----- }	-----	20.7	12.42	3.80	8.62	.92
6	{ 150 pounds acid phosphate----- 25 pounds manure salt----- 100 pounds nitrate of soda ² ----- }	-----	17.4	10.44	3.80	6.64	.70
7	{ 150 pounds acid phosphate----- 25 pounds manure salt----- 100 pounds nitrate of soda ³ ----- }	-----	16.7	10.02	3.80	6.22	.66

¹ Nitrate of soda applied with other materials just before planting.² 50 pounds of nitrate of soda was applied with other materials on May 14; and remaining 50 pounds of nitrate applied as a side-dressing on June 15.³ 25 pounds of nitrate of soda was applied with other materials on May 14; and remaining 75 pounds of nitrate applied as a side-dressing on June 15.

TABLE XIII—AVERAGE OF TWO YEARS' TESTS WITH PERUVIAN GUANO AND NITRATE OF SODA ON CORN.

Number Application.	Fertilizer Application per Acre.	Value of Increased Yield of Shelled Corn Over Cost of Fertilizer.							
		Edgecombe Farm.	Iredell Farm.					Averages.	
			1906.	1904.	1905.	1906.	Two Years.		Three Years.
1	200 pounds of Peruvian guano-----	\$ 6.34	\$ 7.06	\$-----	\$11.08	\$ 9.07	\$-----		
2	400 pounds of Peruvian guano-----	2.12	1.22	-----	9.32	5.27	-----		
3	{ 125 pounds of acid phosphate----- } { 135 pounds of cotton-seed meal----- }	-----	-----	13.40	-----	-----	-----		
4	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 70 pounds of dried blood----- }	-----	5.51	-----	-----	-----	-----		
5	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 50 pounds of nitrate of soda ¹ ----- }	6.03	8.16	14.94	10.65	9.41	11.25		
6	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 100 pounds of nitrate of soda ¹ ----- }	8.62	9.19	16.63	-----	-----	-----		
7	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 100 pounds of nitrate of soda ² ----- }	6.22	-----	-----	12.82	-----	-----		
8	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 100 pounds of nitrate of soda ³ ----- }	6.64	6.91	-----	-----	-----	-----		
9	{ 150 pounds of acid phosphate----- } { 25 pounds of manure salt----- } { 150 pounds of nitrate of soda ⁴ ----- }	-----	-----	17.06	-----	-----	-----		
10	Nothing-----	9.42	-----	-----	9.24	-----	-----		

¹ Nitrate of soda applied with other materials just before planting.

² 25 pounds of nitrate of soda applied with other materials at planting; and remaining 75 pounds of nitrate applied as a side-dressing about June 15.

³ 50 pounds of nitrate of soda applied with other materials at planting; and remaining 50 pounds of nitrate applied as a side-dressing about June 15.

⁴ 100 pounds of nitrate of soda applied with other materials at planting; and remaining 50 pounds of nitrate applied as a side-dressing about June 15.

RESULTS OF PERUVIAN GUANO-NITRATE OF SODA TESTS WITH CORN.

Results of 1904.—At the Iredell farm during this year applications of 50 and 100 pounds of nitrate of soda per acre respectively at planting, each with 150 pounds of acid phosphate and 25 pounds of manure salt, were the ones to induce the largest yield of corn in excess of cost of fertilizer. Two hundred pounds of Peruvian guano per acre proved the next best application during this year with a value of \$7.06 per acre over cost of guano applied; while the plat receiving an application of 400 pounds of guano per acre only yielded enough corn



FIG. 5—Cotton grown at the Iredell Farm without fertilization and in the same series with the Basic Slag and Phosphate Rock Tests.

taken at 60 cents per bushel to leave \$1.22, after paying for the guano, to pay for cultivation, rent, and harvesting, etc., of corn. One hundred pounds of nitrate of soda divided, half going in at planting and the remaining half used as a side-dressing on June 20, with 150 pounds of acid phosphate and 25 pounds of manure salt, as shown by Plat No. 5 of Table IX, yielded enough corn to sell for \$6.91 per acre after paying for the fertilizing mixture applied. The plat receiving an application of 150 pounds of acid phosphate, 25 pounds of manure salt and 70 pounds of dried blood yielded corn to the value of \$5.51 per acre in excess of the cost of its fertilizer application.

Results of 1905.—During this year at the Iredell farm, the only farm at which these tests were conducted, plats to which 100 pounds of nitrate of soda per acre were added respectively each with 150 pounds of acid phosphate and 25 pounds of manure salt were the ones producing the greatest values of corn in excess of the cost of fertilizer added. On one plat all the nitrate of soda went into the soil at planting with the other materials, while the other had 50 pounds of it to go in at planting and the remaining 50 pounds to be added as a side-dressing on June 27.

An application of 125 pounds of acid phosphate and 135 pounds of cotton-seed meal yielded corn enough per acre to pay for the fertilizer at market price of the materials and have \$13.50 worth of corn, taking corn at 60 cents per bushel.

Results of 1906.—At the Iredell farm the most favorable application was one consisting of 150 pounds of acid phosphate, 25 pounds of manure salt and 100 pounds of nitrate of soda per acre, the nitrate being divided and 25 pounds going in just before planting, with the other materials, and the remaining 75 pounds being used as a side-dressing and applied on June 16. During this year at this farm, the use of 200 pounds of Peruvian guano per acre was the second most favorable application with a value of \$11.08 in excess of the cost of the guano; while 400 pounds of Peruvian guano applied per acre only gave \$9.32 as the selling price of the corn in excess of that required to pay for the guano. This latter application only produced eight cents more profit than the plat to which no fertilizer was applied. In fact only eight cents for the trouble and expense of applying the Peruvian guano. However, it must be remembered that as Peruvian guano only acts with moderate rapidity its residual action on subsequent crops should be considered in drawing final conclusions. The guano has a high percentage of total phosphoric acid, the residue of which should prove very beneficial in subsequent years to crops grown on the land to which it has been applied in liberal quantities.

An application of 150 pounds of acid phosphate, 25 pounds of manure salt and 50 pounds nitrate of soda per acre, applied just before planting, produced corn to the value of \$10.65, after deducting the cost of the fertilizing mixture.

At the Edgecombe farm during this year, probably due to excessive rains, that fell during the growing season, all applications of fertilizers proved disappointing in their results in promoting increased yields, as very little effect resulted from any of the applications used, as is seen by comparing the yields of the unfertilized plat (No. 4) with the others, results of which are contained in Table XII. The largest yield and the greatest value of corn produced over cost of fertilizer was from an application of 150 pounds of acid phosphate, 25 pounds of manure salt and 100 pounds of nitrate of soda per acre, applied just before planting the corn. The land at this farm

this year, on which these tests were located, had been in crimson clover the past two years, but with only a fair growth of this legume each year.

CONCLUSIONS.

As stated for cotton, the results on corn will only justify the drawing of tentative conclusions.

Taking the compiled data contained in Table XIII, which embraces one year's result at the Edgecombe farm and three years' results at the Iredell farm, the following tentative deductions may be drawn relative to the growth of corn under conditions as represented by those under which these tests were made:

(1) That fertilization of corn with commercial fertilizers or fertilizing materials, does not pay as well as it does for cotton.

(2) That corn generally responds in profitable increased yields to applications of nitrate of soda, on both sandy loam and clay soils.

(3) That 200 pounds of Peruvian guano per acre is a more profitable application than 400 pounds per acre.

(4) That fertilization of corn pays better on the red clay soil of the Iredell farm than on the sandy loam soil of the Edgecombe farm.

III. BASIC SLAG TESTS WITH COTTON AND CORN.

PLAN OF EXPERIMENTS.

These tests (see Tables XIV and XV) were conducted on one-tenth acre plats at both the Edgecombe and Iredell farms, for the first time during the past year. The tests were planned to study the relative value of Basic or Thomas slag as a phosphatic fertilizing material for both cotton and corn. Permanent plats have been set aside for this work in both localities, and it is proposed to run the different tests on the same plats a number of years in order to study the direct and residual actions on these two crops of the phosphoric acid and lime in this material. From one year's results no deductions will be attempted. The cotton and corn were planted, reduced to a stand and cultivated in the same general way as were the Peruvian guano and nitrate of soda tests. The fertilizer was applied to the cotton plats May 1 and May 2, and to the corn plats May 14 and May 11; while the cotton was planted May 2 and May 3, and the corn May 15 and May 11 at the Edgecombe and Iredell farms respectively.

These tests were located at the Edgecombe farm on the same character of soil which had received the same treatment and grown the same crops for the past four or five years as that used for the Peruvian guano tests in 1906.

TABLE XIV—RESULTS OF BASIC SLAG TESTS WITH COTTON IN 1906.

EDGEcombe FARM.

Number Plat.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield of Seed Cotton in Pounds per Acre.	Value of Seed Cotton at 4 cents per Pound.	Cost of Fertilizer per Acre.	Value of Increase—		
						Over Cost of Fertilizer.	Ranking Unfertilized Plat (No. 4) at 1.00.	Ranking Plat (No. 2) Receiving Normal Application of Fertilizer at 1.00.
1	{ 75 pounds dried blood ---- } { 70 pounds basic slag ----- } { 50 pounds manure salt ---- }	NP½K	1,190	\$47.60	3.38	\$41.22	.99	1.16
2	{ 75 pounds dried blood ---- } { 140 pounds basic slag ----- } { 50 pounds manure salt ---- }	NPK	1,050	42.00	4.01	37.99	.85	1.00
3	{ 75 pounds dried blood ---- } { 280 pounds basic slag ----- } { 50 pounds manure salt ---- }	NP₂K	1,290	51.60	5.27	46.33	1.03	1.22
4	Nothing -----	-----	1,120	44.80	-----	44.80	1.00	1.18
5	{ 75 pounds dried blood ---- } { 420 pounds basic slag ----- } { 50 pounds manure salt ---- }	NP₃K	1,180	47.20	6.73	40.47	.90	1.07
6	{ 150 pounds dried blood ---- } { 280 pounds basic slag ----- } { 100 pounds manure salt ---- }	2(NPK)	1,340	53.60	8.02	45.58	1.02	1.20
7	{ 37½ pounds dried blood ---- } { 33 pounds nitrate of soda ---- } { 140 pounds basic slag ----- } { 50 pounds manure salt ---- }	NPK	1,250	50.00	3.71	46.29	1.03	1.22

TABLE XV—RESULTS OF BASIC SLAG TESTS WITH COTTON IN 1906.

IREDELL FARM.

Number Plat.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield of Seed Cotton in Pounds per Acre.	Value of Seed Cotton, Allowing 4 Cents per Pound.	Cost of Fertilizer per Acre.	Value of Increase—		
						Over Cost of Fertilizer.	Ranking Unfertilized Plat (No. 4) at 1.00.	Ranking Plat (No. 2) Receiving Normal Application of Fertilizer at 1.00.
1	{ 75 pounds dried blood----- 70 pounds basic slag----- 50 pounds manure salt----- }	NP½K	375.00	\$15.00	\$ 3.38	\$11.62	1.61	.76
2	{ 75 pounds dried blood----- 140 pounds basic slag----- 50 pounds manure salt----- }	NPK	482.50	19.30	4.01	15.29	2.12	1.00
3	{ 75 pounds dried blood----- 280 pounds basic slag----- 50 pounds manure salt----- }	NP₂K	450.00	18.00	5.27	12.73	1.77	.83
4	Nothing-----	-----	180.00	7.20	-----	7.20	1.00	.47
5	{ 75 pounds dried blood----- 420 pounds basic slag----- 50 pounds manure salt----- }	NP₃K	420.00	16.80	6.73	10.07	1.40	.66
6	{ 150 pounds dried blood----- 280 pounds basic slag----- 100 pounds manure salt----- }	2(PPK)	685.00	27.40	8.02	19.38	2.69	1.27
7	{ 37½ pounds dried blood ---- 33 pounds nitrate soda----- 140 pounds basic slag----- 50 pounds manure salt----- }	NPK	760.00	30.40	3.71	26.69	3.71	1.75

RESULTS OF BASIC SLAG TESTS WITH COTTON.

The detailed plans and results of these tests are shown by data contained in Tables XIV and XV, the last two columns of the tables showing in a concise way the relative standing of the different applications, when compared with unfertilized plats and plats fertilized with normal applications of fertilizing mixtures. The plats at the Edgcombe farm producing the greatest values above cost of fertilizers applied were those receiving applications of 75 pounds of dried blood, 280 pounds of basic slag and 50 pounds of manure salt; 37½



FIG. 6—Cotton grown at Iredell Farm and fertilized with 75 pounds of Dried Blood, 140 pounds of Basic Slag and 50 pounds of Manure Salt.

pounds of dried blood, 33 pounds of nitrate of soda, 140 pounds of basic slag and 50 pounds of manure salt; and 150 pounds of dried blood, 280 pounds of basic slag and 100 pounds of manure salt per acre. The order of profits from these applications is the order in which the applications are given above. The unfertilized plat produced seed cotton to the value of \$44.80 per acre and ranked in fourth place in order of profitable production.

At the Iredell farm the order of values of increase over cost of fertilizers per acre were in the following order:

First from an application of a mixture of 37½ pounds of dried blood, 33 pounds of nitrate of soda, 140 pounds of basic slag and 50

pounds of manure salt; second from 150 pounds of dried blood, 280 pounds of basic slag and 100 pounds of manure salt; third from 75 pounds of dried blood, 140 pounds of basic slag and 150 pounds of manure salt (see Fig. 6); fourth from 75 pounds of dried blood, 280 pounds of basic slag and 50 pounds of manure salt; fifth from 75 pounds dried blood, 70 pounds of basic slag and 50 pounds of manure salt; sixth from 75 pounds of dried blood, 420 pounds of basic slag and 50 pounds of manure salt; and seventh from the unfertilized plat. It will be noticed that all the yields and values at this farm are remarkably small, this being due largely to a very wet season, followed by a very early frost, which cut off the yields from one-third to one-half. In the eighth column of Table XV it will be seen that an application of $37\frac{1}{2}$ pounds of dried blood, 33 pounds of nitrate of soda, 140 pounds basic slag and 50 pounds of manure salt per acre ranked in value of increase over cost of fertilizer almost three and three-quarters as much as the unfertilized plat did per acre; while an application of 75 pounds of dried blood, 140 pounds of basic slag and 50 pounds of manure salt gave two and twelve-hundredth times the increase of no fertilization.

TABLE XVI—RESULTS OF TESTS WITH BASIC SLAG ON CORN IN 1906.

EDGEcombe FARM.

Plat Number.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield in Bushels of Shelled Corn per Acre.	Value of Corn at 60 Cents per Bushel.	Cost of Fertilizer per Acre.	Value of Corn per Acre Over Cost of Fertilizer.	Value of Increase Ranking Unfertilized, Plat (No. 4) at 1.00.
1	{ 65 pounds dried blood ----- 55 pounds basic slag ----- 25 pounds manure salt ----- }	NP $\frac{1}{2}$ K	26.2	\$15.72	\$ 2.70	\$13.02	1.66
2	{ 65 pounds dried blood ----- 110 pounds basic slag ----- 25 pounds manure salt ----- }	NPK	20.2	12.00	3.19	8.81	1.12
3	{ 65 pounds dried blood ----- 220 pounds basic slag ----- 25 pounds manure salt ----- }	NP $_2$ K	18.7	11.22	4.18	7.04	.90
4	Nothing -----	-----	13.1	7.86	-----	7.86	1.00
5	{ 65 pounds dried blood ----- 330 pounds basic slag ----- 25 pounds manure salt ----- }	NP $_3$ K	17.8	10.68	5.17	5.51	.70
6	{ 130 pounds dried blood ----- 220 pounds basic slag ----- 50 pounds manure salt ----- }	2(NPK)	20.0	12.00	6.38	5.62	.72
7*	{ 32 $\frac{1}{2}$ pounds dried blood ----- 30 pounds nitrate of soda ----- 110 pounds basic slag ----- 25 pounds manure salt ----- }	NPK	17.0	10.20	2.97	7.23	.92

TABLE XVII—RESULTS OF TESTS WITH BASIC SLAG ON CORN IN 1906.
IREDELL FARM.

Number Plat.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield in Bushels of Shelled Corn per Acre.	Value of Corn at 60 Cents per Bushel.	Cost of Fertilizer per Acre.	Value of Corn per Acre Over Cost of Fertilizer.
1	<div> 65 pounds dried blood ----- 55 pounds basic slag ----- 25 pounds manure salt ----- </div>	NP½K	20.7	\$12.42	\$ 2.70	\$ 9.72
2	<div> 65 pounds dried blood ----- 110 pounds basic slag ----- 25 pounds manure salt ----- </div>	NPK	21.1	12.66	3.19	9.47
3	<div> 65 pounds dried blood ----- 220 pounds basic slag ----- 25 pounds manure salt ----- </div>	NP₂K	24.2	14.52	4.18	10.34
4	<div> 65 pounds dried blood ----- 330 pounds basic slag ----- 25 pounds manure salt ----- </div>	NP₃K	25.4	15.24	5.17	10.07
5	<div> 130 pounds dried blood ----- 220 pounds basic slag ----- 50 pounds manure salt ----- </div>	2(NPK)	30.4	18.24	6.38	11.86
6	<div> 32½ pounds dried blood ----- 30 pounds nitrate of soda ----- 110 pounds basic slag ----- 25 pounds manure salt ----- </div>	NPK	27.2	16.32	2.97	13.35

RESULTS OF BASIC SLAG TESTS WITH CORN.

In Tables XVI and XVII are embraced the results of these tests conducted during 1906 at the Edgecombe and Iredell farms. The application yielding most favorably at Edgecombe above cost of fertilizer was one consisting of 65 pounds of dried blood, 55 pounds of basic slag and 25 pounds of manure salt per acre, applied in the drill just before planting. This gave a value above cost of fertilizer as seen by Table XVI of one and sixty-six hundredths more than the unfertilized plat. The application per acre ranking second, third, fourth and fifth were: 65 pounds of dried blood, 110 pounds judged by this year's results, were in the following order: 32½ pounds of dried blood, 30 pounds of nitrate of soda, 110 pounds of basic slag and 25 pounds of manure salt; and 65 pounds of dried blood, 220 pounds of basic slag and 25 pounds of manure salt respectively.

At the Iredell farm the most favorable applications per acre, as judged by this year's results, were in the following order: 32½ pounds of dried blood, 30 pounds of nitrate of soda, 110 pounds of basic slag and 25 pounds of manure salt; 130 pounds dried blood, 220 pounds of basic slag and 50 pounds of manure salt; 65 pounds of dried blood, 220 pounds of basic slag and 25 pounds of manure salt; 65 pounds of dried blood, 330 pounds of basic slag and 25 pounds of manure salt; 65 pounds of dried blood, 55 pounds of basic

slag and 25 pounds of manure salt; and 65 pounds of dried blood, 110 pounds of basic slag and 25 pounds of manure salt.

IV. GROUND PHOSPHATE ROCK TESTS WITH COTTON AND CORN. PLAN OF EXPERIMENTS.

These tests (see Tables XVIII and XIX) were planned and put out primarily to test the value of finely ground phosphate rock as a carrier of phosphoric acid to cotton and corn. The tests are to be conducted on the same plats through a number of years in order not



FIG. 7—Cotton grown at Iredell Farm and fertilized with 75 pounds of Dried Blood, 200 pounds of Phosphate Rock and 50 pounds of Manure Salt.

only to study its effect upon the first year's crops, but to study its residual effects on these crops planted in subsequent years. The preparation of the land, cultivations, etc., were in a general way the same as for preceding tests. The fertilizers were applied to the cotton plats on May 2 and to the corn plats on May 9, while the cotton was planted May 3 and the corn May 11.

Tests outside of the general fertilizer tests, with this material, were only conducted at the Iredell farm during the past year, but it is proposed to repeat them at the Edgecombe farm during the coming and subsequent years. King's Improved cotton and Weekley's Improved corn were used for planting these tests.

TABLE XVIII—RESULTS OF TESTS WITH FINELY GROUND PHOSPHATE ROCK WITH COTTON IN 1906.

IREDELL FARM.

Plat Number.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield of Seed Cotton in Pounds per Acre.	Value of Seed Cotton at 4 Cents per Pound.	Cost of Fertilizer per Acre.	Value of Increase—	
						Over Cost of Fertilizer.	Ranking Unfertilized Plat (No. 4) at 1.00.
1	{ 75 pounds dried blood ----- 200 pounds phosphate rock ----- 50 pounds manure salt ----- }	NP ₂ K	712.50	\$28.50	\$ 3.75	\$24.75	1.99
2	{ 2,000 pounds stable manure ----- 160 pounds phosphate rock ----- 10 pounds manure salt ----- }	NP ₂ K	650.00	26.00	2.90	23.10	1.86
3	{ 150 pounds dried blood ----- 200 pounds phosphate rock ----- 50 pounds manure salt ----- }	(NP) ₂ K	430.00	17.20	6.00	11.20	.90
4	Nothing -----		310.00	12.40	-----	12.40	1.00
5	{ 4,000 pounds stable manure ----- 600 pounds phosphate rock ----- }	(NP) ₂ K	495.00	19.80	7.00	12.80	1.03
6	{ 75 pounds dried blood ----- 400 pounds phosphate rock ----- 50 pounds manure salt ----- }	NP ₄ K	487.50	19.50	4.75	14.75	1.19
7	{ 2,000 pounds stable manure ----- 350 pounds phosphate rock ----- 10 pounds manure salt ----- }	NP ₄ K	480.00	19.20	3.85	15.35	1.24

RESULTS OF PHOSPHATE ROCK TESTS WITH COTTON.

The two applications per acre producing the clearest increase over cost of fertilizer, as seen by seventh column of Table XVIII, were mixtures of 75 pounds of dried blood, 200 of finely ground phosphate rock and 50 pounds of manure salt (see Fig. 7), and 2,000 pounds of stable manure, 160 pounds finely ground phosphate rock and 10 pounds of manure salt. These plats produced at the rate of \$12.35 and \$10.70 per acre respectively more than the unfertilized plat after deducting the cost of the fertilizing mixtures added to each; in other words, the first application yielded almost twice as much profit while the other one cleared one and eighty-six hundredths more per acre than the unfertilized portion.

The evidence points strongly to the cause of the poor showing made by an application of 150 pounds of dried blood, 200 pounds of finely ground phosphate rock and 50 pounds of manure salt per acre as due largely to a greater damage done by a very early frost. This plat

received double quantity of nitrogen from dried blood, which material contains this constituent in a rather readily available form, hence a tendency was produced to a prolonged vigorous growth of the cotton; this tendency was also accentuated by the type of soil on which these experiments were conducted.

TABLE XIX—RESULTS OF TESTS WITH GROUND PHOSPHATE ROCK ON CORN IN 1906.

IREDELL FARM.

Number Plat.	Fertilizer Application per Acre.	Fertilizer Formula.	Yield in Bushels of Shelled Corn per Acre.	Value of Corn at 60 Cents per Bushel.	Cost of Fertilizer per Acre.	Value of Corn per Acre Over Cost of Fertilizer.
1	{ 65 pounds dried blood ----- } { 150 pounds ground phosphate rock ----- } { 25 pounds manure salt ----- }	NP ₂ K	16.8	\$10.08	\$ 2.95	\$ 7.13
2	{ 2,000 pounds stable manure ----- } { 170 pounds ground phosphate rock ----- }	NP ₂ K	17.2	10.32	2.85	7.47
3	{ 130 pounds dried blood ----- } { 150 pounds ground phosphate rock ----- } { 25 pounds manure salt ----- }	(NP) ₂ K	23.4	14.04	4.90	9.14
4	{ 4,000 pounds stable manure ----- } { 150 pounds ground phosphate rock ----- }	(NP) ₂ K	22.0	13.20	4.75	8.45
5	{ 65 pounds dried blood ----- } { 300 pounds ground phosphate rock ----- } { 25 pounds manure salt ----- }	NP ₄ K	20.2	12.12	3.70	8.42
6	{ 2,000 pounds stable manure ----- } { 170 pounds ground phosphate ----- }	NP ₄ K	18.0	10.80	2.85	7.95

RESULTS OF PHOSPHATE ROCK TESTS WITH CORN.

In these tests the plat producing the most favorable showing was the one receiving an application of 130 pounds of dried blood, 150 pounds of finely ground phosphate rock and 25 pounds of manure salt per acre applied in the drill just before planting. As there are not at this stage of the experiments any striking differences in the results from the different applications on corn, further discussion of them will be reserved until more data are at hand.

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CORN AND COTTON PLATS—EDGECOMBE TEST FARM,

FEBRUARY, 1907

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THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 2

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, FEBRUARY, 1907.

SEVENTH (PARTIAL¹) REPORT OF THE WORK ON THE DEPARTMENT TEST FARMS FOR SEASON 1906, INCLUDING VARIETY AND DISTANCE TESTS OF CORN AND COTTON.

BY

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AND

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On the following pages are recorded the results of this year's work with the variety and distance tests of corn and cotton on the Department's Test Farms. The testing of these two factors in the production of cotton and corn is of the most fundamental importance, as is evidenced by the difference in yield of different varieties and of different distancing when grown side by side in the same field, on the same type of soil, with identical cultivation and fertilization. Its importance is further emphasized when it is considered that 64.7

¹ The main portion of the work for 1902, 1903, 1904, 1905 and 1906 is reserved for publication later, when the results of our tests, which have now been running some six or seven years, will be brought together, with the view of drawing such conclusions as may be warranted on the subjects covered by the experiments.

² B. F. Walton was Superintendent of the Experiment Station farm during 1903, 1904 and 1905.

per cent (17.5 per cent to cotton and 47.2 per cent to corn) of the cultivated lands of North Carolina are devoted to these two crops with the small average annual yields of 215 pounds of lint cotton and 12.8 bushels shelled corn per acre. If by carefully conducted experiments through a number of years the most advantageous distancing and most prolific varieties of corn and cotton on the different types of soil for an average season can be ascertained, and farmers generally be induced to use the best varieties and distances in growing these crops, material assistance will have been rendered in increasing the total amounts per acre of these crops grown in the State. Increasing the average yield of corn one bushel and seed cotton fifty pounds per acre will, according to the census of 1900, increase the annual profits of the farmers of North Carolina by about \$3,650,000, allowing sixty cents per bushel for shelled corn and three and one-half cents per pound for seed cotton. This does not appear, with the hearty coöperation of farmers, such a far-distant possibility, in the light of results obtained during the past seven years in our testing of varieties of corn and cotton. Take, for example, the results of our variety tests at the Edgecombe farm¹ during this time. In comparative variety tests of corn, with the number of varieties in the different tests varying from eight to thirty-two, we have found the difference between the one yielding the highest and the one the lowest amount of shelled corn per acre in the individual tests to range from 6.2 to 26.6 bushels. With cotton the range of difference in the different tests has been all the way from 530 to 915 pounds of seed cotton per acre, when from seven to twenty-six varieties were used in the different tests. It must not be forgotten that the best distancing of any crop is principally dependent upon soil fertility, while yield of variety is governed largely by soil fertility and adaptability and by the rigidity with which selection of seed of desirable characteristics has been made.

LOCATION AND CHARACTER OF SOILS OF TEST FARMS.

Edgecombe Farm.—This farm is located in Edgecombe County, about midway between the towns of Tarboro and Rocky Mount, and about two miles from Kingsboro, a station on the Atlantic Coast Line Railway.

¹ The results at the Edgecombe farm are taken for these comparisons because, it being the oldest farm, we have data for a greater number of years.

The soil of this farm consists, principally, of sandy loam, with moderately fine sand, underlaid by a rather tenacious sandy clay subsoil at a depth, generally, of from 8 to 12 inches. The subsoil is a moderately good sandy clay, such as is found under the larger portion of the lands of the eastern part of the State. This type of soil responds very readily in remunerative crops to proper fertilization and cultivation, and represents a large and important part of the coastal plain formation, which comprises something like forty per cent of the total area of the State. It is the type of soil designated by the National Bureau of Soils as Norfolk fine sandy loam.

Red Springs Farm.—This farm is situated in the coastal plain region, about one mile east of the corporate limits of the town of Red Springs in Robeson County, on a coarse, sandy soil that has a sandy clay subsoil from 12 to 15 inches below the surface. This type of soil is found in considerable areas in the eastern and southeastern portions of the State, and being of a dry nature and warming up early in the spring, it is especially adapted to the growth of truck and other crops where early maturity is an important consideration. Although this type of soil is not as strong as that found on the Edgecombe farm it will produce fairly good yields under liberal fertilization and proper cultivation and rotation of crops.

Iredell Farm.—This farm, located in the Piedmont section of the State, lies about one and one-half miles northwest of the corporate limits of Statesville, and is bisected by the Statesville and Western Division of the Southern Railway.

The soil consists of a deep red tenacious clay soil and subsoil, which is a type covering a large area of the Piedmont Plateau of this and other South Atlantic States. Generally the only difference between the surface and subsoil in this type of soil is that the former, having been broken up by cultivation and weathering, has more or less vegetable matter worked into it.

This soil is naturally strong, and is susceptible of high productivity under judicious fertilization and proper cultural management. It is especially adapted to the growth of grains, grasses and clover.

Transylvania Farm.—This farm is located at Blantyre on the west side of the French Broad River twelve miles directly west of Hendersonville, and is situated on both sides of the Hendersonville

and Lake Toxaway Branch of the Asheville and Spartanburg Division of the Southern Railway. The farm embraces both bottom and mountain-side soils; the former soil being of a fine sandy loamy character and containing much organic matter and a liberal supply of plant food constituents, while the latter one is largely made up of Porter's loam. The French Broad River bottom soil is deep and fertile and generally produces tolerably large crops when not subject to too great overflows during the growing season. The phase of the Porter's loam found here is dark red to grayish in color. The topsoil of this is usually from 6 to 12 inches deep and is underlaid by a stiff clay loam. This type of soil is found quite generally in relatively large areas on the low ridges and mountain slopes of western North Carolina. It washes badly if not covered by forest or carefully looked after when cultivated. This soil, when not too steep, is devoted, to some extent, to general farming and fruit growing, the latter especially in the rich coves which possess the proper physical aspect.

Experiment Station Farm.—This farm lies about two miles south of Raleigh, and its soil is made up largely of Cecil sandy loam. This is a brownish sandy-clay loam about 7 to 10 inches deep and overlying a red-clay subsoil, both of which contain from twenty to thirty per cent of medium to coarse rock fragments. After the Cecil clay, this is the largest and most important type of soil in the Piedmont section of the State. In this section, it is the soil used most largely for cotton, sweet potatoes, truck, gardens and orchards. It also produces grain tolerably well, but is not generally as well suited to these and the grasses as is Cecil clay.

I. VARIETY, VARIETY-DISTANCE AND DISTANCE TESTS OF CORN.

Preparation and Cultivation.—The plats were all broke alike with a two-horse turning plow 8 to 10 inches deep and harrowed. Soon after the rows were run 4 to 5 inches deep and 4 feet apart in variety tests and the several distances in the distance tests. The stalks in the variety tests were reduced to a stand of $2\frac{1}{2}$ feet in the row.

The fertilizer materials were applied uniformly in these drills and covered, the application being at the following rate per acre in all tests:

Three hundred pounds of a mixture of acid phosphate, dried blood and manure salt,¹ which contained 7 per cent available phosphoric acid, $1\frac{1}{2}$ per cent potash and 3 per cent nitrogen (equal to 3.64 per cent ammonia), costing \$3.24, were used.

The slight ridges formed in covering the fertilizer were opened and the corn planted a little below the level, all tests of the same kind at the same farm being given the same treatment as to time of planting and otherwise. All cultivations were as nearly level as possible and rather deep early in the season, with the small hoes of the Planet Jr. Cultivator, but became shallower, using the large hoes as the season advanced and the roots extended towards the middle of the rows and nearer the surface. This system of cultivation afforded pretty thorough breaking of the land early in the season and prevented the disturbance of the root systems of the plants later. An effort was made to cultivate every ten or twelve days, as far as the weather would permit, and especially immediately after rains, in order to produce a fine dust mulch with the shallow running plows, to retard the evaporation of the recently-added moisture.

The varieties of corn were harvested and shocked on September 5 at the Edgecombe farm, on September 3 at the Iredell farm, on August 17 to September 6 at the Experiment Station farm, and on September 11 to October 10 at the Transylvania farm, as each variety matured; but were not husked until November 21 and 22 at Edgecombe, November 2 at Iredell, October 3 and 4 at Experiment Station, and in November at Transylvania.

RESULTS OF VARIETY TESTS OF CORN.

The results of these tests are contained in the following tables:

¹ Manure salt is a potash compound, containing about 20 per cent of potash, principally in the form of muriate.

TABLE I—RESULTS OF

EDGECOMBE

Rank in Productivity.		Varieties Tested.	Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.	Yield per Plat.	
Shelled Corn.	Stover.		For Perfect Stand.	By Actual Count.		Stalks.	Ears.			Large Ears—Pounds.	Nubbins—Pounds.
1	1	Cocke's Prolific	176	166	July 3	111.6	57.2	307	1.85	165.50	9.25
2	7	Weekley's Improved	176	156	" 14	114.0	47.3	311	1.99	135.50	12.50
3	20	Biggs' Seven Ear	176	150	" 3	122.4	18.5	386	2.57	117.75	28.50
4	10	Sanders' Improved	176	154	" 9	124.8	59.8	220	1.43	110.00	8.00
5	14	McMackin's Gourd Seed	176	150	" 13	127.2	56.8	159	1.06	105.50	8.00
6	15	Holt's Strawberry	176	159	" 8	128.4	62.3	131	.82	105.25	12.00
7	14	Eureka	176	162	" 3	133.2	60.8	194	1.20	115.00	8.50
8	8	Marlboro Prolific	176	156	" 13	127.2	50.4	259	1.66	117.50	5.00
9	5	Cocke's Prolific	176	149	" 4	126.6	52.1	230	1.54	111.00	7.50
10	19	American Queen	176	156	" 10	113.4	42.9	188	1.21	103.25	13.00
11	18	Currituck	176	144	" 5	117.6	49.6	167	1.16	101.75	9.00
11	17	Hickory King	176	152	" 3	115.8	45.5	218	1.43	100.00	9.00
12	9	Williams'	176	164	" 8	124.0	58.5	172	1.05	105.50	8.00
13	12	Brake's	176	145	" 4	123.0	60.4	158	1.09	98.50	7.50
14	2	Shellem's Prolific	176	154	" 3	107.4	39.9	271	1.76	113.50	10.00
15	6	Hastings' Prolific	176	140	" 11	125.4	56.0	274	1.96	87.25	28.00
16	11	Southern Beauty	176	162	" 4	120.6	55.4	163	1.01	98.00	6.50
17	3	Mosby's Prolific	176	149	" 13	120.0	56.0	232	1.56	89.50	14.00
18	27	Boone County White	176	145	" 3	113.4	46.9	140	.97	102.00	4.25
19	23	Peele's Prolific	176	144	" 9	118.2	47.8	148	1.03	94.25	10.00
20	24	Selection 77.	176	166	" 3	120.0	48.4	149	.90	91.25	10.25
21	25	Iowa Silver Mine	176	145	June 28	101.4	39.0	149	1.03	91.00	5.25
22	19	Farmers' Favorite	176	168	July 4	118.2	53.7	174	1.04	94.25	7.00
23	26	Wilson's Success	176	153	" 5	123.6	57.2	180	1.18	88.25	7.00
24	30	Reid's Yellow Dent	176	138	" 3	105.6	39.6	154	1.12	92.75	7.00
25	29	Riley's Favorite	176	147	June 28	102.8	40.4	159	1.02	87.75	10.25
25	16	Battle's Prolific	176	134	July 3	116.4	42.0	148	1.10	96.25	6.25
26	22	Hickory King	176	164	" 3	105.6	46.0	179	1.09	84.00	6.00
27	13	Boone County Special	176	142	" 3	109.8	43.4	124	.87	104.00	3.50
28	4	Boone County White	176	143	" 3	117.0	41.5	134	.94	103.25	7.00
29	28	Leaming Yellow	176	158	June 26	103.2	37.3	141	.89	77.00	10.00
30	21	Thomas' Improved	176	170	July 4	115.8	46.5	-----	-----	96.25	5.50

VARIETY TEST OF CORN.

FARM.

Yield per Acre.		Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
Ears—Pounds.	Shelled Corn—Bushels.			Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.			
4325.1	59.3	128	73.0	8.50	5.75	76.7	23.3	52.2	47.8	3966	60	Edgecombe Farm.
3663.0	53.1	145	69.0	7.75	7.00	81.2	18.8	52.9	47.1	3267	59	Iredell Farm.
3619.7	52.2	183	68.0	6.75	6.75	82.4	17.6	58.5	41.5	2567	59	North Carolina.
2920.5	44.2	123	66.0	7.50	7.50	84.8	15.2	49.2	50.8	3020	57	Georgia.
2809.1	43.2	91	65.0	8.75	7.50	86.2	13.8	50.4	49.6	2760	55	Tennessee.
2901.9	42.7	76	68.0	9.25	8.00	82.4	17.6	52.1	47.9	2667	52	Virginia.
3056.6	42.5	113	72.0	9.00	7.25	77.8	22.2	52.5	47.5	2760	57	Virginia.
3031.9	42.1	152	72.0	7.25	7.00	77.8	22.2	49.0	51.0	3156	60	South Carolina.
2932.9	41.9	136	70.0	8.50	5.75	80.0	20.0	46.5	53.5	3378	59	Tennessee.
2877.2	41.1	113	70.0	7.25	7.00	80.0	20.0	52.8	47.2	2568	57	North Carolina.
2741.1	40.9	101	67.0	8.75	7.50	83.6	16.4	51.5	48.5	2580	57	North Carolina.
2697.8	40.9	132	66.0	8.00	5.75	84.8	15.2	50.7	49.3	2624	56	Tennessee.
2809.1	40.7	105	69.0	8.25	7.75	81.2	18.8	49.0	51.0	3131	60	North Carolina.
2623.5	40.4	97	65.0	7.00	8.75	86.2	13.8	48.2	51.8	2822	55	North Carolina.
3056.6	40.2	167	76.0	7.50	6.25	73.7	26.3	46.5	53.5	3512	57	North Carolina.
2852.4	39.6	171	72.0	7.00	6.50	77.8	22.2	46.1	53.9	3335	58	Georgia.
2586.4	38.0	106	68.0	8.25	6.50	82.4	17.6	47.5	52.5	2859	55	North Carolina.
2561.6	37.7	152	68.0	7.75	7.00	82.4	17.6	42.2	57.8	3502	56	Mississippi.
2629.7	37.6	92	70.0	8.75	7.50	80.0	20.0	59.0	41.0	1825	57	Indiana.
2580.2	37.4	98	69.0	8.25	7.00	81.2	18.8	53.5	46.5	2245	58	North Carolina.
2512.1	37.0	100	68.0	9.00	6.50	82.4	17.6	53.4	46.6	2190	56	Ohio.
2382.2	36.6	101	65.0	8.50	8.00	86.2	13.8	55.0	45.0	1949	54	Illinois.
2505.9	35.8	120	70.0	9.50	7.25	80.0	20.0	49.4	50.6	2568	57	North Carolina.
2357.4	35.7	125	66.0	7.75	7.50	84.8	15.2	56.0	43.0	1850	56	North Carolina.
2468.8	35.3	108	70.0	8.00	7.00	80.0	20.0	68.8	31.2	1120	56	Illinois.
2425.5	35.2	112	69.0	8.00	7.75	81.2	18.8	67.6	32.4	1163	56	Indiana.
2536.9	35.2	104	72.0	8.25	8.00	77.8	22.2	48.8	51.2	2661	56	North Carolina.
2227.5	34.8	127	64.0	7.75	6.75	87.5	12.5	47.4	52.6	2475	56	Virginia.
2660.6	34.6	89	77.0	9.50	8.25	72.7	27.3	48.9	51.1	2785	55	Illinois.
2728.7	34.5	96	79.0	9.00	6.75	70.9	29.1	44.1	55.9	3459	55	Tennessee.
2153.3	33.6	104	64.0	7.50	7.50	87.5	12.5	62.1	37.9	1312	53	Ohio.
2518.3	32.7	-----	77.0	8.00	7.50	72.7	27.3	49.6	50.4	2555	59	North Carolina.

TABLE I—RESULTS OF VARIETY

IREDELL

Rank in Productivity.		Varieties Tested.	Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.		Yield per Plat.	
Shelled Corn.	Stover.		For Perfect Stand.	By Actual Count.		Stalks.	Ears.				Large Ears—Pounds.	Nubbins—Pounds.
1	10	Weekley's Improved-----	218	217	July 13	114.0	54.0	407	1.88	140.00	11.75	
2	9	American Queen-----	218	206	" 10	108.0	42.0	320	1.55	132.50	8.50	
3	4	Farmers' Favorite-----	218	220	" 6	123.0	54.0	236	1.07	135.00	6.25	
4	2	Williams'-----	218	206	" 10	120.0	60.0	260	1.26	133.50	8.50	
5	7	Brake's-----	218	218	" 13	123.0	57.0	230	1.06	120.50	8.50	
6	6	Marlboro Prolific-----	218	212	" 13	126.0	54.0	226	1.07	125.00	10.00	
7	11	Cocke's Prolific-----	218	220	" 10	108.0	42.0	490	2.23	125.00	12.50	
8	5	Hickory King-----	218	206	" 6	117.0	54.0	230	1.12	117.00	11.00	
9	19	Biggs' Seven Ear-----	218	212	" 10	120.0	42.0	560	2.64	121.25	10.00	
10	18	Battle's Prolific-----	218	210	" 5	111.0	45.0	222	1.06	118.50	5.00	
11	13	Thomas' Improved-----	218	210	" 6	108.0	48.0	260	1.24	123.50	4.00	
12	14	Shellem's Prolific-----	218	224	" 6	120.0	54.0	320	1.43	116.00	7.25	
12	29	Riley's Favorite-----	218	204	June 30	114.0	48.0	210	1.03	122.00	9.50	
13	20	Southern Beauty-----	218	200	July 13	123.0	60.0	188	.94	111.00	6.00	
14	21	Boone County White-----	218	208	" 6	120.0	48.0	218	1.05	123.00	4.50	
15	17	Sanders' Improved-----	218	220	" 14	120.0	54.0	342	1.55	103.00	9.50	
16	24	Selection 77-----	218	220	" 3	120.0	48.0	280	1.27	113.00	7.75	
17	16	Peele's Prolific-----	218	212	" 6	120.0	54.0	272	1.28	108.00	9.00	
18	1	Currituck-----	218	218	" 15	117.0	54.0	198	.91	114.50	1.50	
19	22	Boone County White-----	218	214	" 6	114.0	48.0	230	1.08	116.00	6.00	
20	26	Leaming Yellow-----	218	222	June 30	99.0	36.0	220	.99	106.00	7.50	
21	8	Hastings' Prolific-----	218	210	July 16	132.0	66.0	286	1.36	91.50	14.00	
21	18	Cocke's Prolific-----	218	216	" 13	117.0	48.0	243	1.13	96.50	12.00	
22	27	Reid's Yellow Dent-----	218	209	" 5	111.0	48.0	214	1.02	101.75	6.25	
23	15	Eureka-----	218	207	" 6	124.0	60.0	230	1.11	117.50	6.25	
24	3	Holt's Strawberry-----	218	204	" 16	126.0	72.0	205	1.00	106.50	6.50	
25	12	McMackin's Gourd Seed-----	218	216	" 14	123.0	60.0	214	.99	99.50	8.50	
26	25	Iowa Silver Mine-----	218	218	June 30	102.0	42.0	212	.97	103.00	7.00	
26	23	Mosby's Prolific-----	218	213	July 13	120.0	60.0	266	1.22	93.50	8.50	
27	28	Boone County Special-----	218	220	" 2	114.0	51.0	208	.95	92.50	5.25	

TEST OF CORN—CONTINUED.

FARM.

Ears—Pounds.	Shelled Corn—Bushels.	Yield per Acre.	Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
					Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.			
3035.0	42.0	144	72.3	8.00	6.00	77.5	22.5	49.8	50.2	3065	56	Iredell Farm.	
2820.0	40.8	85	69.2	7.50	6.25	80.9	19.1	47.8	52.2	3080	53	North Carolina.	
2825.0	40.5	84	69.7	10.00	6.50	80.4	19.6	44.8	55.2	3475	56	North Carolina.	
2840.0	40.4	76	70.3	10.00	8.00	79.7	20.3	42.4	57.6	3860	52	North Carolina.	
2580.0	40.3	107	64.0	7.50	7.50	87.5	12.5	44.5	55.5	3220	56	North Carolina.	
2700.0	40.2	149	67.2	7.25	6.00	83.3	16.7	45.0	55.0	3300	56	South Carolina.	
2750.0	39.9	138	68.9	9.00	6.00	81.3	18.7	47.4	52.6	3050	56	Edgecombe Farm.	
2560.0	39.6	140	64.7	8.00	6.00	86.5	13.5	42.7	57.3	3440	49	Tennessee.	
2625.0	38.8	187	67.6	7.00	5.50	82.8	17.2	50.5	49.5	2575	52	North Carolina.	
2470.0	38.7	91	63.9	9.00	7.00	87.7	12.3	48.4	51.6	2630	54	North Carolina.	
2550.0	37.9	107	67.2	9.00	7.25	83.3	16.7	47.2	52.8	2850	52	North Carolina.	
2465.0	36.7	163	67.2	8.25	5.50	83.3	16.7	47.4	52.6	2735	53	North Carolina.	
2630.0	36.7	140	70.0	7.50	6.50	80.0	20.0	61.2	38.8	1670	49	Indiana.	
2340.0	36.6	128	64.0	8.50	6.50	87.5	12.5	48.8	51.2	2460	48	North Carolina.	
2550.0	36.4	124	70.0	9.25	7.00	80.0	20.0	51.0	49.0	2450	50	Tennessee.	
2250.0	35.7	140	63.0	7.50	6.25	88.9	11.1	45.9	54.1	2650	52	Georgia.	
2415.0	35.3	124	68.5	9.00	6.75	81.8	18.2	53.7	46.3	2085	51	Ohio.	
2340.0	34.8	107	67.2	10.00	8.25	83.3	16.7	46.8	53.2	2660	50	North Carolina.	
2320.0	34.5	93	67.2	7.00	8.00	83.3	16.7	36.3	63.7	4080	49	North Carolina.	
2440.0	33.9	134	71.9	9.75	7.25	77.9	22.1	50.8	49.2	2360	50	Indiana.	
2270.0	33.4	138	67.9	8.00	7.00	82.5	17.5	54.0	46.0	1930	51	Ohio.	
2110.0	32.7	195	64.5	8.00	5.50	86.8	13.2	39.8	60.2	3190	50	Georgia.	
2170.0	32.7	166	66.3	8.00	6.50	84.4	15.6	45.2	54.8	2630	54	Tennessee.	
2160.0	32.4	121	66.6	7.75	6.50	84.1	15.9	54.0	46.0	1840	50	Illinois.	
2475.0	32.0	144	73.2	10.00	6.25	75.5	23.5	47.6	52.4	2725	52	Virginia.	
2260.0	31.7	97	70.6	8.50	8.25	79.3	20.7	39.0	61.0	3540	45	Virginia.	
2160.0	31.3	132	69.1	8.50	7.75	81.0	19.0	41.5	58.5	3040	48	Tennessee.	
2200.0	30.4	144	72.3	8.00	7.25	77.5	22.5	52.4	47.6	2000	49	Illinois.	
2040.0	30.4	149	67.2	8.75	6.00	83.3	16.7	48.6	51.4	2160	52	Mississippi.	
1955.0	28.7	130	68.2	8.25	7.25	82.1	17.9	52.8	47.2	1745	48	Illinois.	

TABLE I—RESULTS OF VARIETY

TRANSYLVANIA

Rank in Productivity.	Varieties Tested.		Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.	Yield per Plat.	
Shelled Corn.	Stover.		For Perfect Stand.	By Actual Count.		Stalks.	Ears.			Large Ears—Pounds.	Nubbins and Unsound Corn—Pounds.
1	----	Hickory King-----	261	247	Aug. 1	112.8	51.6	306	1.24	192.75	36.25
2	----	Cocke's Prolific-----	261	246	" 1	117.0	57.6	429	1.74	200.75	41.75
2	----	Holt's Strawberry-----	261	210	" 10	120.5	61.8	214	1.02	202.25	45.50
3	----	Sanders' Improved-----	261	236	" 10	129.4	66.5	366	1.55	207.00	38.50
4	----	Eureka-----	261	244	" 10	136.7	69.6	375	1.54	213.00	39.25
5	----	Weekley's Improved-----	261	235	" 5	111.8	59.6	463	1.97	204.00	44.00
6	----	Southern Beauty-----	261	234	" 5	123.5	55.4	289	1.24	190.00	35.75
7	----	Marlboro Prolific-----	261	238	" 10	129.5	67.6	405	1.70	191.25	38.00
8	----	McMackin's Gourd Seed-----	261	225	" 10	131.2	64.3	249	1.11	195.25	35.00
9	----	Peele's Prolific-----	261	236	" 5	118.1	52.3	241	1.02	197.25	37.25
10	----	Biggs' Seven Ear-----	261	240	" 5	124.8	65.0	536	2.23	191.00	41.75
11	----	Battle's Prolific-----	261	218	" 1	122.8	60.6	222	1.02	192.00	35.50
12	----	American Queen-----	261	245	" 5	122.0	58.8	472	1.93	196.25	41.00
13	----	Williams'-----	261	240	" 5	129.8	67.4	278	1.16	213.50	39.00
14	----	Thomas' Improved-----	261	247	" 1	118.7	56.9	298	1.21	198.00	36.50
15	----	Shellem's Prolific-----	261	246	" 1	110.6	54.6	426	1.73	184.75	39.50
16	----	Farmers' Favorite-----	261	229	" 5	122.2	51.0	215	.94	192.50	35.50
17	----	Currituck-----	261	228	" 1	123.1	59.4	241	1.06	181.75	38.50
18	----	Boone County White-----	261	239	July 25	111.8	49.0	252	1.05	176.25	45.50
19	----	Merrill (Native)-----	261	237	Aug. 1	120.7	57.8	237	1.00	190.50	25.00
20	----	Brake's-----	261	205	" 5	125.6	64.8	211	1.03	167.00	41.00
21	----	Hickory King-----	261	242	" 1	111.0	54.0	296	1.22	181.25	20.00
22	----	Hastings' Prolific-----	261	232	" 10	121.3	61.0	453	1.95	175.25	41.50
23	----	Boone County White-----	261	221	" 1	113.4	47.4	225	1.02	169.00	40.00
24	----	Cocke's Prolific-----	261	234	" 1	110.4	48.0	223	.97	173.50	37.25
25	----	Selection 77-----	261	245	" 1	112.6	47.4	248	1.01	168.75	37.00
26	----	Hamilton (Native)-----	261	245	July 20	99.8	44.6	243	.99	157.00	41.25
27	----	Mosby's Prolific-----	261	233	Aug. 10	127.9	69.0	348	1.49	155.75	41.75
28	----	Cocke's Prolific-----	261	242	" 5	129.5	63.7	412	1.70	180.00	38.50
29	----	Riley's Favorite-----	261	252	July 25	104.9	44.0	255	1.01	145.00	41.00
30	----	Boone County Special-----	261	218	Aug. 1	109.0	44.4	207	.95	149.50	41.50
31	----	Iowa Silver Mine-----	261	223	July 20	97.7	39.8	230	1.03	139.50	26.50
32	----	Leaming Yellow-----	261	237	" 20	96.8	33.2	238	1.00	128.75	26.75
33	----	Reid's Yellow Dent-----	261	238	" 25	102.5	45.2	245	1.03	120.00	22.00

TEST OF CORN—CONTINUED.

FARM.

Yield per Acre.		Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Percentage Shrinkage of Corn on Ear of Varieties from November 6 to January 12.	Source of Seed.
Ears—Pounds.	Shelled Corn—Bushels.			Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.			
3817.4	60.2	85	63.4	-----		88.3	11.7	-----				3.6 Tennessee.
4041.3	58.7	122	68.8	-----		81.4	18.6	-----				4.1 Edgecombe Farm.
4130.0	58.7	61	70.4	-----		79.5	20.5	-----				7.6 Virginia.
4092.5	58.5	104	69.9	-----		80.1	19.9	-----				6.6 Georgia.
4205.0	57.8	108	72.8	-----		76.9	23.1	-----				5.6 Virginia.
4134.2	57.6	134	71.7	-----		78.1	21.9	-----				2.5 Iredell Farm.
3763.3	56.3	86	66.9	-----		83.6	16.4	-----				7.0 North Carolina.
3821.6	56.1	121	68.1	-----		82.2	17.8	-----				5.6 South Carolina.
3838.3	56.0	74	68.5	-----		80.3	19.7	-----				5.3 Tennessee.
3909.1	55.5	72	70.4	-----		79.5	20.5	-----				8.9 North Carolina.
3879.9	55.1	162	70.4	-----		79.6	20.4	-----				3.9 North Carolina.
3792.4	55.0	67	69.0	-----		81.2	18.8	-----				2.5 North Carolina.
3955.0	54.9	143	72.1	-----		77.4	22.6	-----				7.4 North Carolina.
4209.2	54.7	85	77.0	-----		72.7	27.3	-----				6.3 North Carolina.
3909.1	54.6	91	71.7	-----		78.1	21.9	-----				16.7 North Carolina.
3738.2	53.9	132	69.4	-----		80.7	19.3	-----				2.0 North Carolina.
3800.8	53.6	67	70.9	-----		79.0	21.0	-----				5.4 North Carolina.
3671.6	52.8	76	69.5	-----		80.6	19.4	-----				4.3 North Carolina.
3596.6	52.4	80	68.7	-----		81.5	18.5	-----				3.9 Indiana.
3592.4	51.9	76	69.2	-----		80.9	19.1	-----				5.6 North Carolina.
3467.4	51.6	68	67.2	-----		83.3	16.7	-----				3.9 North Carolina.
3354.8	50.9	97	65.9	-----		85.0	15.0	-----				3.6 Virginia.
3613.2	50.8	149	71.1	-----		78.8	21.2	-----				5.2 Georgia.
3484.0	48.4	77	72.0	-----		77.7	22.3	-----				3.9 Tennessee.
3513.2	48.3	79	72.7	-----		77.0	23.0	-----				6.3 Transylvania Farm.
3429.9	48.2	86	71.7	-----		78.8	21.2	-----				4.3 Ohio.
3304.8	47.8	85	69.2	-----		80.9	19.1	-----				3.5 North Carolina.
3292.3	47.6	122	69.1	-----		81.0	19.0	-----				8.2 Mississippi.
3642.4	47.2	145	77.2	-----		72.5	27.5	-----				6.1 Tennessee.
3100.6	47.1	90	65.8	-----		85.1	14.9	-----				2.9 Indiana.
3184.0	44.7	77	71.2	-----		78.7	21.3	-----				2.9 Illinois.
2767.2	39.7	97	69.7	-----		80.3	19.7	-----				1.6 Illinois.
2592.2	38.2	104	67.9	-----		82.5	17.5	-----				7.0 Ohio.
2367.1	35.4	115	66.8	-----		83.8	16.2	-----				3.0 Illinois.

TABLE I—RESULTS OF VARIETY
EXPERIMENT

Rank in Productivity.		Varieties Tested.	Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.		Yield per Plat. ¹	
Shelled Corn.	Stover.		For Perfect Stand.	By Actual Count.		Stalks.	Ears.		Large Ears—Pounds.	Nubbins—Pounds.		
1	2	Sanders' Improved -----	106	105	-----	88.0	38.5	123	1.17	28.25	8.88	
2	9	Marlboro Prolific-----	159	150	-----	87.0	37.5	231	1.54	39.25	13.13	
3	3	Cocke's Prolific -----	159	156	-----	93.0	38.0	202	1.29	40.13	13.12	
4	1	Cocke's Prolific -----	106	105	-----	94.0	41.5	145	1.38	24.75	9.75	
5	11	Weekley's Improved -----	159	153	-----	81.0	34.5	223	1.46	38.38	12.37	
6	4	Mosby's Prolific-----	106	101	-----	90.0	40.0	122	1.21	21.25	10.00	
7	15	Leaming Yellow -----	106	102	-----	82.5	25.0	97	.95	23.07	9.06	
8	16	Reid's Yellow Dent -----	106	104	-----	85.0	29.0	103	.99	25.41	4.34	
9	5	Holt's Strawberry -----	159	151	-----	93.5	41.5	155	1.03	30.88	13.37	
10	12	Pool's-----	159	148	-----	90.5	34.0	188	1.27	28.81	14.25	
10	13	Selection 77 -----	106	103	-----	88.0	32.5	129	1.25	19.63	9.87	
11	6	Hickory King-----	159	153	-----	87.5	17.5	157	1.03	27.75	13.13	
12	18	Boone County White-----	159	156	-----	86.0	34.0	148	.95	28.00	12.00	
13	10	Craig's Prolific Strawberry-----	159	148	-----	78.5	32.0	146	.99	22.69	14.19	
13	8	Iowa Silver Mine-----	106	103	-----	82.5	27.5	109	1.06	15.75	10.25	
14	17	Riley's Favorite-----	106	102	-----	89.5	33.0	99	.97	15.75	9.13	
15	7	No. 167-----	106	104	-----	90.0	34.0	106	1.02	15.25	10.63	
16	14	Boone County White-----	159	155	-----	88.0	35.5	185	1.19	20.50	15.88	
17	9	Craig's Prolific White -----	159	146	-----	85.5	36.5	152	1.04	20.51	12.25	

¹Cocke's Prolific (Edgecombe), Weekley's Improved, Craig's Prolific Strawberry, Craig's Prolific White, Pool's, Holt's Strawberry, Marlboro Prolific, Hickory King, Boone County White (Indiana) and Boone County White (Tennessee) were planted on 1-27 acre plats, while the remaining varieties were on 2-81 acre plats.

TEST OF CORN FOR 1903—CONTINUED.

STATION FARM.

Ears—Pounds.	Yield per Acre.		Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.		Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
	Shelled Corn—Bushels.					Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.			
1503.8	23.2	133	64.7	-----	-----	-----	-----	86.5	13.5	42.2	57.8	2060	-----	Georgia.
1414.2	20.5	213	69.1	-----	-----	-----	-----	81.1	18.9	44.0	56.0	1799	-----	South Carolina.
1438.0	20.2	218	71.2	-----	-----	-----	-----	78.7	21.3	41.1	58.9	2059	-----	Edgecombe Farm.
1397.3	20.1	172	69.6	-----	-----	-----	-----	80.4	19.6	39.4	60.6	2146	-----	Tennessee.
1370.0	19.8	230	69.1	-----	-----	-----	-----	81.0	19.0	44.0	56.0	1681	-----	South Carolina.
1265.6	19.5	187	64.9	-----	-----	-----	-----	86.3	13.7	38.1	61.9	2055	-----	Mississippi.
1301.3	19.4	141	67.1	-----	-----	-----	-----	83.5	16.5	46.6	53.4	1494	-----	Ohio.
1204.9	18.2	139	66.2	-----	-----	-----	-----	84.6	15.4	45.4	54.6	1448	-----	Illinois.
1194.8	17.9	136	66.8	-----	-----	-----	-----	83.8	16.2	37.3	62.7	2004	-----	Virginia.
1162.6	17.3	188	67.1	-----	-----	-----	-----	83.5	16.5	41.4	58.6	1645	-----	North Carolina.
1194.8	17.3	154	68.9	-----	-----	-----	-----	81.3	18.7	42.5	57.5	1620	-----	Ohio.
1103.8	17.1	176	64.4	-----	-----	-----	-----	87.0	13.0	40.5	59.5	1866	-----	Tennessee.
1080.0	15.8	141	68.3	-----	-----	-----	-----	82.0	18.0	46.0	54.0	1269	-----	Tennessee.
995.8	15.7	159	63.4	-----	-----	-----	-----	88.3	11.7	36.3	63.7	1745	-----	North Carolina.
1053.0	15.7	167	67.0	-----	-----	-----	-----	83.6	16.4	36.9	63.1	1802	-----	Illinois.
1007.6	15.1	170	66.7	-----	-----	-----	-----	84.0	16.0	44.0	56.0	1281	-----	Indiana.
1048.1	15.0	154	69.9	-----	-----	-----	-----	80.1	19.9	36.7	63.3	1807	-----	Pennsylvania.
982.3	14.4	165	68.2	-----	-----	-----	-----	82.1	17.9	37.9	62.1	1610	-----	Indiana.
884.5	14.0	167	63.3	-----	-----	-----	-----	88.5	11.5	33.0	67.0	1799	-----	North Carolina.

TABLE I—RESULTS OF VARIETY

EXPERIMENT

Rank in Productivity.			Varieties Tested.	Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.	Yield per Plat. ¹	
Shelled Corn.	Stover.	For Perfect Stand.		By Actual Count.	Stalks.		Ears.	Large Ears—Pounds.			Nubbins—Pounds.	
1	11	Biggs' Seven Ear -----	106	106 -----	102.0	39.0	173	1.63	35.50	9.25		
2	8	Sanders' Improved -----	106	106 -----	107.0	51.0	110	1.04	33.75	6.00		
2	17	Reids' Yellow Dent -----	106	106 -----	100.0	36.0	103	.97	30.50	10.00		
3	4	Cocke's Prolific -----	169	169 -----	109.3	47.0	198	1.18	53.25	10.00		
4	19	Leaming Yellow -----	106	105 -----	91.0	28.0	103	.98	29.00	9.75		
4	17	Riley's Favorite -----	106	106 -----	91.0	34.0	111	1.05	30.50	8.00		
5	16	Boone County Special -----	106	106 -----	99.0	37.0	98	.92	28.75	9.75		
6	1	Holt's Strawberry -----	106	106 -----	108.0	51.0	106	1.00	24.25	13.75		
7	14	Selection 77 -----	106	105 -----	102.0	40.0	102	.97	29.50	8.25		
8	2	Horse-tooth -----	169	169 -----	107.0	50.0	163	.99	38.50	15.75		
9	14	Boone County White -----	106	105 -----	98.0	39.0	103	.98	26.25	10.50		
10	6	Weekley's Improved -----	106	106 -----	102.0	46.0	141	1.33	29.75	7.00		
11	9	Craig's Prolific White -----	106	106 -----	96.0	44.0	107	1.01	23.75	10.25		
12	15	Boone County White -----	106	106 -----	99.0	38.0	97	.92	27.25	9.00		
13	9	Mosby's Prolific -----	106	106 -----	105.0	51.0	112	1.06	27.75	6.25		
14	5	Williams' -----	169	169 -----	108.0	46.0	161	.95	47.50	9.50		
15	12	Craig's Prolific Strawberry -----	106	106 -----	106.0	42.0	108	1.02	23.25	10.00		
16	18	Iowa Silver Mine -----	106	105 -----	88.0	29.0	106	1.01	23.75	10.25		
17	13	Cocke's Prolific -----	169	170 -----	106.0	48.0	178	1.05	41.00	11.50		
18	10	McMackin's Gourd Seed -----	106	106 -----	109.0	49.0	98	.92	21.75	11.38		
19	3	Square Deal -----	106	106 -----	108.0	51.0	103	.97	17.25	9.25		

¹ Cocke's Prolific (Elgecombe), Cocke's Prolific (Tennessee), Williams' and Horse-tooth were planted on 3-80 acre plats; while all others were on 1-40 acre plats.

TEST OF CORN FOR 1904—CONTINUED.

STATION FARM.

Yield per Acre.		Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
Ears—Pounds.	Shelled Corn—Bushels.			Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.			
1790.0	26.7	180	67.1	-----	-----	83.4	16.6	46.6	53.4	2050	-----	North Carolina.
1590.0	25.1	132	63.4	-----	-----	88.3	11.7	43.2	56.8	2090	-----	Georgia.
1620.0	25.1	111	64.4	-----	-----	87.0	13.0	51.9	48.1	1500	-----	Illinois.
1686.7	24.8	141	68.0	-----	-----	82.4	17.6	42.9	57.1	2247	-----	Edgecombe Farm.
1550.0	23.7	132	65.4	-----	-----	85.6	14.4	55.0	45.0	1270	-----	Ohio.
1540.0	23.7	131	65.0	-----	-----	86.2	13.8	50.7	49.3	1500	-----	Indiana.
1540.0	23.5	117	65.6	-----	-----	85.4	14.6	50.0	50.0	1580	-----	Illinois.
1520.0	23.1	103	65.7	-----	-----	85.2	14.8	38.4	61.6	2440	-----	Virginia.
1510.0	22.9	129	65.8	-----	-----	85.1	14.9	48.1	51.9	1630	-----	Ohio.
1446.7	22.6	101	64.1	-----	-----	87.3	12.7	38.0	62.0	2353	-----	North Carolina.
1470.0	22.4	124	65.7	-----	-----	85.3	14.7	47.4	52.6	1630	-----	Tennessee.
1470.0	22.1	173	66.6	-----	-----	84.1	15.9	40.8	59.2	2130	-----	Iredell Farm.
1360.0	22.0	127	62.2	-----	-----	90.1	9.9	39.8	60.2	2060	-----	North Carolina.
1450.0	21.8	116	66.4	-----	-----	84.3	15.7	47.4	52.6	1610	-----	Indiana.
1360.0	21.5	147	63.3	-----	-----	88.5	11.5	39.8	60.2	2060	-----	Mississippi.
1520.0	21.4	111	71.0	-----	-----	78.9	21.1	41.1	58.9	2187	-----	North Carolina.
1330.0	21.3	124	62.5	-----	-----	89.6	10.4	40.3	59.7	1970	-----	North Carolina.
1360.0	20.7	144	65.8	-----	-----	85.1	14.9	48.6	51.4	1440	-----	Illinois.
1400.0	20.6	136	68.0	-----	-----	82.4	17.6	43.4	56.6	1827	-----	Tennessee.
1325.2	20.1	123	66.0	-----	-----	84.8	15.2	39.2	60.8	2055	-----	Tennessee.
1060.0	15.9	143	66.5	-----	-----	84.2	15.8	31.2	68.8	2340	-----	North Carolina.

TABLE I—RESULTS OF VARIETY

EXPERIMENT

Rank in Productivity.	Shelled Corn. Stover.	Varieties Tested.	Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.	Yield per Plat.	
			For Perfect Stand.	By Actual Count.		Stalks.	Ears.			Large Ears—Pounds.	Nubbins—Pounds.
1	13	Cocke's Prolific -----	106	106	-----	98.0	32.0	191	1.80	54.00	10.50
2	10	Thomas' Improved -----	106	105	-----	108.0	41.0	114	1.09	50.38	4.00
3	15	Cocke's Prolific -----	106	106	-----	114.0	51.0	137	1.30	49.00	6.13
4	5	Sanders' Improved -----	106	106	-----	115.0	48.0	132	1.24	43.25	7.75
5	12	Native -----	106	103	-----	108.0	50.0	108	1.05	48.00	6.88
6	8	Marlboro Prolific -----	106	102	-----	110.0	44.0	161	1.58	46.75	6.25
6	7	Hickory King -----	106	105	-----	112.0	44.0	138	1.31	43.00	6.75
7	9	McMackin's Gourd Seed -----	106	103	-----	118.0	37.0	107	1.39	40.00	9.75
8	23	Leaming Yellow -----	106	102	-----	96.0	24.0	107	1.05	44.00	5.25
9	19	Boone County Special -----	106	105	-----	108.0	39.0	113	1.08	37.50	11.75
10	17	Boone County White -----	106	105	-----	109.0	40.0	110	1.05	41.50	8.25
11	11	Hickory King -----	106	104	-----	107.0	42.0	130	1.25	37.25	8.25
12	18	Selection 77 -----	106	105	-----	114.0	43.0	107	1.02	41.25	7.00
12	21	Reid's Yellow Dent -----	106	106	-----	102.0	37.0	107	1.01	38.00	9.00
13	6	Weekley's Improved -----	106	102	-----	110.0	46.0	167	1.63	39.00	8.25
14	16	Boone County White -----	106	104	-----	113.0	44.0	104	1.00	37.25	9.00
15	20	Riley's Favorite -----	106	105	-----	103.0	36.0	103	.98	37.50	7.63
16	14	Shellem's Prolific -----	106	104	-----	107.0	38.0	156	1.50	37.75	6.50
16	22	Iowa Silver Mine -----	106	104	-----	95.0	32.0	105	1.01	35.00	10.00
17	8	Peele's Prolific -----	106	105	-----	105.0	41.0	108	1.03	35.00	9.00
18	2	Cocke's Prolific -----	106	105	-----	120.0	51.0	142	1.35	36.50	8.75
19	1	Eureka -----	106	104	-----	124.0	52.0	124	1.19	37.38	6.75
20	4	Mosby's Prolific -----	106	103	-----	111.0	51.0	128	1.24	36.00	4.00
21	3	Holt's Strawberry -----	106	102	-----	111.0	54.0	106	1.04	29.50	11.00

TEST OF CORN FOR 1905—CONTINUED.

STATION FARM.

Yield per Acre.		Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
Ears—Pounds.	Shelled Corn—Bushels.			Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.			
2580.0	37.9	144	68.0	6.75	6.00	82.4	17.6	58.5	41.5	1830	-----	Experiment Station Farm.
2175.2	33.1	115	65.8	7.75	6.50	85.1	14.9	53.3	46.7	1905	-----	North Carolina.
2205.2	31.9	157	69.2	7.50	5.75	80.9	19.1	56.4	43.6	1730	-----	Edgecombe Farm.
2040.0	31.7	135	64.3	7.00	6.00	87.1	12.9	49.0	51.0	2120	-----	Georgia.
2195.2	31.5	110	69.7	8.00	6.75	80.3	19.7	54.3	45.7	1850	-----	North Carolina.
2120.0	31.1	166	68.2	6.50	5.50	82.1	17.9	52.2	47.8	1940	-----	South Carolina.
1990.0	31.1	138	63.9	7.75	5.50	87.7	12.3	50.0	50.0	1990	-----	Tennessee.
1990.0	29.9	116	66.5	7.00	7.00	84.2	15.8	51.0	49.0	1910	-----	Tennessee.
1970.0	29.6	134	66.5	7.50	6.50	84.2	15.8	63.6	36.4	1130	-----	Ohio.
1970.0	29.3	116	67.2	8.00	6.50	83.3	16.7	55.3	44.7	1590	-----	Illinois.
1990.0	29.2	121	68.1	7.75	7.00	82.2	17.8	54.4	45.6	1670	-----	Indiana.
1820.0	28.7	145	63.5	6.75	6.50	88.2	11.8	48.9	51.1	1900	-----	Virginia.
1930.0	28.3	121	68.1	7.50	6.25	82.2	17.8	54.2	45.8	1630	-----	Ohio.
1880.0	28.3	134	66.5	7.50	6.50	84.2	15.8	57.1	42.9	1310	-----	Illinois.
1890.0	28.1	171	67.3	7.00	5.75	83.2	16.8	48.4	51.6	2014	-----	Iredell Farm.
1850.0	27.5	119	67.2	7.75	6.50	83.3	16.7	52.3	47.7	1685	-----	Tennessee.
1805.2	27.3	139	66.2	7.25	6.50	84.6	15.4	57.9	42.1	1315	-----	Indiana.
1770.0	26.9	192	65.9	7.00	5.00	85.0	15.0	49.4	50.6	1810	-----	North Carolina.
1800.0	26.9	141	67.0	7.50	6.25	83.6	16.4	58.3	41.7	1290	-----	Illinois.
1760.0	26.4	117	66.7	7.75	6.75	84.0	16.0	47.6	52.4	1940	-----	North Carolina.
1810.0	25.9	169	69.8	7.50	6.00	80.2	19.8	43.3	56.7	2320	-----	Tennessee.
1765.2	25.4	148	69.4	8.00	5.50	80.7	19.3	42.8	57.2	2355	-----	Virginia.
1600.0	24.7	165	64.9	6.50	5.50	86.3	13.7	42.8	57.2	2160	-----	Mississippi.
1620.0	23.9	132	67.9	7.00	7.50	82.5	17.5	41.4	58.6	2290	-----	Virginia.

TABLE I—RESULTS OF VARIETY

EXPERIMENT

Rank in Productivity.	Shelled Corn.	Stover.	Varieties Tested.	Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.	Yield per Plat.	
				For Perfect Stand.	By Actual Count.		Stalks.	Ears.			Large Ears—Pounds.	Nubbins—Pounds.
1	10		Biggs' Seven Ear -----	212	209	July 14	101.8	43.0	297	1.42	77.13	10.00
2	11		Hickory King -----	212	207	" 7	101.1	42.0	204	.99	77.63	6.75
3	5		Cocke's Prolific -----	212	212	" 12	100.5	45.6	231	1.09	80.75	4.50
4	6		Marlboro Prolific -----	212	210	" 14	103.3	47.0	232	1.10	72.38	6.00
5	16		Boone County White -----	212	201	" 7	99.4	40.0	188	.94	66.13	9.63
6	14		Boone County White -----	212	206	" 10	99.7	39.0	183	.89	72.25	4.25
7	3		Cocke's Prolific -----	212	209	-----	108.4	51.0	207	.99	71.63	5.00
7	11		Southern Beauty -----	212	206	" 13	103.6	44.0	189	.92	66.00	6.75
8	13		Shellem's Prolific -----	212	212	" 11	97.6	40.0	233	1.10	69.75	3.50
9	9		Currituck -----	212	199	" 14	105.7	47.0	174	.87	62.83	8.50
10	19		Reid's Yellow Dent -----	212	208	" 6	97.6	39.0	196	.94	65.50	7.38
11	21		Iowa Silver Mine -----	212	209	" 3	89.8	33.0	196	.94	67.50	4.63
12	5		Sanders' Improved -----	212	206	" 16	106.5	49.0	193	.94	59.50	8.75
13	18		Selection 77 -----	212	209	" 7	104.0	42.0	199	.95	67.00	4.13
14	4		Weekley's Improved -----	212	203	" 14	99.0	43.9	217	1.07	62.13	8.13
15	17		Boone County Special -----	212	208	" 10	102.5	39.0	182	.88	59.63	10.13
16	2		Mosby's Prolific -----	212	196	-----	110.6	54.0	189	.96	58.13	7.75
16	22		Leaming Yellow -----	212	206	June 29	87.6	30.0	197	.96	59.75	7.63
17	15		Farmers' Favorite -----	212	200	July 10	105.7	45.0	182	.91	60.38	8.13
18	20		Riley's Favorite -----	212	206	" 1	95.5	35.0	193	.94	59.50	7.88
19	12		Battle's Prolific -----	212	204	" 8	100.0	40.0	166	.82	57.00	9.63
20	8		McMackin's Gourd Seed -----	212	201	" 11	109.4	51.0	173	.86	54.38	5.63
21	1		Eureka -----	212	209	" 15	103.8	51.0	187	.89	55.50	6.13
22	7		Peele's Prolific -----	212	202	" 11	103.0	51.0	166	.84	45.63	12.88

TEST OF CORN FOR 1906—CONTINUED.

STATION FARM.

Ears—Pounds.	Yield per Acre.	Shelled Corn—Bushels.	Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.		Weight in Pounds of Measured Bushels of Shelled Corn.	Source of Seed.
					Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.				
1742.6	26.1	194	66.8	6.60	6.20	84.0	16.0	53.9	46.1	1489	56.3	North Carolina.		
1687.6	25.9	119	65.2	7.90	6.20	86.0	14.0	53.2	46.8	1483	53.8	Tennessee.		
1705.0	24.4	166	69.9	7.62	6.30	80.0	20.0	50.6	49.4	1666	56.5	Edgecombe Farm.		
1567.6	23.2	136	67.6	6.60	6.20	83.0	17.0	48.8	51.2	1647	52.8	South Carolina.		
1515.2	22.7	111	66.8	7.50	7.00	84.0	16.0	52.8	47.2	1357	51.4	Indiana.		
1530.0	22.4	112	68.3	8.40	7.30	82.0	18.0	52.2	47.8	1401	51.5	Tennessee.		
1532.6	22.3	136	68.7	8.80	6.80	81.5	18.5	47.3	52.7	1710	54.3	Tennessee.		
1455.0	22.3	122	65.3	7.82	6.70	86.0	14.0	49.5	50.5	1483	51.3	North Carolina.		
1465.0	22.2	132	66.0	8.50	5.50	85.0	15.0	51.0	49.0	1407	51.0	North Carolina.		
1427.6	21.9	118	65.2	7.40	7.00	86.0	14.0	48.1	51.9	1540	51.8	North Carolina.		
1457.6	21.6	128	67.5	9.20	6.80	83.0	17.0	54.5	45.5	1218	50.0	Illinois.		
1442.6	21.4	135	67.4	7.50	6.70	83.0	17.0	55.9	44.1	1136	49.3	Illinois.		
1365.0	21.2	128	64.4	7.00	6.40	87.0	13.0	45.0	55.0	1666	51.3	Georgia.		
1422.6	21.1	123	67.4	8.10	6.30	83.0	17.0	52.4	47.6	1294	50.3	Ohio.		
1405.2	20.8	166	67.5	7.65	6.20	83.0	17.0	45.3	54.7	1697	56.0	Iredell Farm.		
1395.2	20.7	112	67.4	8.00	6.20	83.0	17.0	51.8	48.2	1300	51.0	Illinois.		
1317.6	20.5	144	64.3	6.80	7.40	87.0	13.0	43.3	56.7	1723	52.8	Mississippi.		
1347.6	20.5	159	65.7	7.90	6.80	85.0	15.0	57.2	42.8	1010	55.3	Ohio.		
1370.2	20.3	112	67.5	9.40	6.70	83.0	17.0	50.1	49.9	1363	54.3	North Carolina.		
1347.6	20.2	136	66.7	8.40	7.00	84.0	16.0	53.7	46.3	1161	49.3	Indiana.		
1332.6	20.0	114	66.6	7.40	7.30	84.0	16.0	48.0	52.0	1445	50.6	North Carolina.		
1200.2	17.8	114	67.4	6.20	6.20	83.0	17.0	43.0	57.0	1590	50.3	Tennessee.		
1232.6	17.6	148	70.0	8.42	6.20	80.0	20.0	39.6	60.4	1880	53.0	Virginia.		
1170.2	17.3	112	67.6	7.90	7.40	83.0	17.0	41.8	58.2	1628	50.5	North Carolina.		

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN.

EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		Aver- ages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.
Cocke's Prolific (Edgecombe)---	20.0	2	28.1	2	35.2	1	24.4	1	30.3	5	35.9	1	59.3	1	33.2	1
Cocke's Prolific (Tenn.) -----							19.9	7	26.4	12	26.8	14	41.9	9		
Weekley's Improved -----	19.4	3	29.5	1	33.5	2	19.5	10	25.5	13	35.5	2	53.1	2	30.9	2
Pool's -----					26.1	5	19.7	8			31.5	5				
Craig's Prolific Strawberry -----					29.1	3	16.1	16	27.8	8						
Sanders' Improved -----	17.8	4	27.0	3	27.1	4	15.3	17	31.0	3	31.8	4	44.2	4	27.7	3
Holt's Strawberry -----	22.4	1	25.7	6	24.9	6	16.2	15	18.6	25	30.6	7	42.7	6	25.9	4
Craig's Prolific White -----					24.6	7	14.9	18	27.1	10	24.1	21				
Champion White Pearl -----					21.6	8										
Cooley's Red Cob -----	17.2	6			20.6	10										
Improved Golden Dent -----			22.5	7												
Champion Dent -----			22.2	8												
Hickory King (Tenn.) -----			21.4	9			20.1	6			31.2	6	40.9	11		
Mosby's Prolific -----	17.4	5							23.4	18	23.9	22	37.7	17		
Tatum's Choice -----	17.0	7														
Shaw's Improved -----	16.2	8														
Tennessee Yellow -----			26.6	5												
Killebrew's (Native) -----			26.9	4	21.4	9	22.4	2								
Leaming Yellow -----					20.0	12	21.1	4	24.6	15	24.1	21	33.6	29		
Brake's -----					20.5	11	13.7	19	23.5	7	26.9	13	40.4	13		
Marlboro Prolific -----							17.6	13	32.3	2	27.9	11	42.1	8		
Biggs' Seven Ear -----							21.4	3	32.4	1			52.2	3		
Iowa Silver Mine -----							17.3	14	25.2	14	22.3	24	36.6	21		
Reid's Yellow Dent -----							17.8	12	23.4	18	23.3	23	35.3	24		
Riley's Favorite -----							19.6	9	22.8	20	24.6	18	35.2	25		
Boone County White (Ind.) -----							19.4	11	26.8	11	23.3	23	37.6	18		
Boone County White (Tenn.) -----							17.6	13	23.9	17	28.9	9	34.5	28		
Number 167 -----							16.2	15								
Selection 77 -----							20.2	5	24.5	16	29.5	8	37.0	20		
Cocke's Prolific (Pou) -----									32.3	2						
Williams' -----									30.5	4	24.1	21	40.7	12		

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CONTINUED.

EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		Averages.
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	
Square Deal -----									29.6	6	25.0	17			
Boone County Special -----									27.3	9	25.2	16	34.6	27	
McMackin's Gourd Seed -----									23.3	19	25.9	15	43.2	5	
Horse-tooth -----									22.3	21					
Currituck -----									21.4	22	23.3	23	40.9	11	
Thomas' Improved -----									20.6 ¹	23	32.4	3	32.7	30	
Chester County Mammoth -----									20.3	24					
Hickory King (Va.) -----											28.1	10	34.8	26	
Eureka -----											27.7	12	42.5	7	
Peele's Prolific -----											24.6	18	37.4	19	
Shellem's Prolific -----											24.5	19	40.2	14	
Native -----											24.2	20			
American Queen -----													41.1	10	
Hastings' Prolific -----													39.6	15	
Southern Beauty -----													38.0	16	
Farmers' Favorite -----													35.8	22	
Wilson's Success -----													35.7	23	
Battle's Prolific -----													35.2	25	

¹This variety was planted later than the others and had to be put on poorer land, hence should not be included in the comparisons.

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CONTINUED.

RED SPRINGS FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		Averages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.
Native-----	22.4	1	14.1	4	-----	-----	-----	-----	18.3	1
Coman's Best-----	16.6	2	-----	-----	-----	-----	-----	-----	-----	-----
Mosby's Prolific-----	15.4	3	-----	-----	-----	-----	-----	-----	-----	-----
Bradbury's Improved-----	15.0	4	-----	-----	-----	-----	-----	-----	-----	-----
Cocke's Prolific-----	14.4	5	15.3	3	-----	-----	-----	-----	14.9	2
Blount's Prolific-----	10.2	6	-----	-----	-----	-----	-----	-----	-----	-----
Improved Golden Dent-----	10.0	7	14.1	5	-----	-----	-----	-----	12.1	4
Clarke's Mastodon-----	9.0	8	-----	-----	-----	-----	-----	-----	-----	-----
Holt's Strawberry-----	8.4	9	17.3	2	-----	-----	-----	-----	12.9	3
Weekley's Improved-----	-----	-----	19.0	1	-----	-----	-----	-----	-----	-----
Sanders' Improved-----	-----	-----	14.0	6	-----	-----	-----	-----	-----	-----
Tennessee Yellow-----	-----	-----	13.5	7	-----	-----	-----	-----	-----	-----
Hickory King (Tenn.)-----	-----	-----	12.4	8	-----	-----	-----	-----	-----	-----
Champion Dent-----	-----	-----	11.3	9	-----	-----	-----	-----	-----	-----

TABLE 11—COMPILED RESULTS OF VARIETY TESTS OF CORN—CONTINUED.

IREDELL FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		Averages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.
Biggs' Seven Ear-----							29.7	1	31.8	2			38.8	9		
Craig's Prolific Strawberry-----							24.7	2	26.0	6						
Marlboro Prolific-----							24.3	3			33.5	12	40.2	6		
Craig's Prolific White-----							23.9	4	28.8	3	31.8	18				
Cocke's Prolific (Tenn.)-----							23.5	5	22.5	14	35.2	9	32.7	21	28.5	3
Weekley's Improved-----							23.3	6	23.4	10	40.3	2	42.0	1	32.3	1
Mosby's Prolific-----							22.6	7	21.9	18	27.5	31	30.4	26	25.6	10
Boone County White (Tenn.)-----							22.6	7	24.6	7	27.8	30	36.4	14	27.9	4
Holt's Strawberry-----							21.9	8	22.3	16	31.7	19	31.7	24	26.9	7
Riley's Favorite-----							21.9	8	20.4	22	28.7	27	36.7	12	26.9	7
Pool's-----							21.8	9			35.4	8				
Sanders' Improved-----							21.7	10	23.5	9	33.4	13	35.7	15	28.6	2
Selection 77-----							21.2	11	22.9	12	29.7	25	35.3	16	27.3	6
Reid's Yellow Dent-----							20.8	12	21.5	19	31.3	20	32.4	22	26.5	8
Leaming Yellow-----							20.8	12	22.5	14	31.0	21	33.4	20	26.9	7
Hickory King (Tenn.)-----							20.7	13			38.1	6	39.6	8		
Iowa Silver Mine-----							20.6	14	22.5	14	30.5	24	30.4	26	26.0	9
Boone County White (Ind.)-----							19.9	15	24.2	8	32.8	14	33.9	19	27.7	5
Number 167-----							17.1	16								
Brake's-----									32.4	1	37.4	7	40.3	5		
Cocke's Prolific (Edgecombe)-----									26.3	4	41.0	1	39.9	7		
Horse-tooth-----									26.1	5						
Currituck-----									23.3	11	30.9	22	34.5	18		
Native-----									22.7	13	28.0	29				
Thomas' Improved-----									22.5	14	38.8	4	37.9	11		
Williams'-----									22.4	15	38.7	5	40.4	4		
Boone County Special-----									22.3	16	32.5	15	28.7	27		
Shellem's Prolific-----									22.2	17	33.9	10	36.7	12		
Pride of Burke-----									21.5	19						
McMackin's Gourd Seed-----									21.1	20	28.5	28	31.3	25		

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CONTINUED.

EXPERIMENT STATION FARM.

Varieties Tested.	1903.		1904.		1905.		1906.		Averages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.
Sanders' Prolific-----	23.2	1	25.1	2	31.7	4	21.2	12	25.3	2
Marlboro Prolific-----	20.5	2	-----	-----	31.1	6	23.2	4	-----	-----
Cocke's Prolific (Edgecombe)-----	20.2	3	24.8	3	31.9	3	24.4	3	25.6	1
Cocke's Prolific (Tennessee)-----	20.1	4	20.6	17	25.4	18	22.3	7	22.1	6
Weekley's Improved-----	19.8	5	22.1	10	28.1	13	20.8	14	22.7	4
Mosby's Prolific-----	19.5	6	21.5	13	24.7	19	20.5	16	21.6	8
Leaming Yellow-----	19.4	7	23.7	4	29.6	8	20.5	16	23.3	3
Reid's Yellow Dent-----	18.2	8	25.1	2	28.3	12	21.6	10	23.3	3
Holt's Strawberry-----	17.9	9	23.1	6	23.9	20	-----	-----	-----	-----
Pool's-----	17.3	10	-----	-----	-----	-----	-----	-----	-----	-----
Selection 77-----	17.3	10	22.9	7	28.3	12	21.1	13	22.4	5
Hickory King (Tennessee)-----	17.1	11	-----	-----	31.1	6	25.9	2	-----	-----
Boone County White (Tennessee)-----	15.8	12	22.4	9	27.5	14	22.4	6	22.0	7
Craig's Prolific Strawberry-----	15.7	13	21.3	15	-----	-----	-----	-----	-----	-----
Iowa Silver Mine-----	15.7	13	20.7	16	26.9	16	21.4	11	21.2	9
Riley's Favorite-----	15.1	14	23.7	4	27.3	15	20.2	18	21.6	8
Number 167-----	15.0	15	-----	-----	-----	-----	-----	-----	-----	-----
Boone County White (Indiana)-----	14.4	16	21.8	12	29.2	10	22.7	5	22.0	7
Craig's Prolific White-----	14.0	17	22.0	11	-----	-----	-----	-----	-----	-----
Biggs' Seven Ear-----	-----	-----	26.7	1	-----	-----	26.1	1	-----	-----
Boone County Special-----	-----	-----	23.5	5	29.3	9	20.7	15	-----	-----
Horse-tooth-----	-----	-----	22.6	8	-----	-----	-----	-----	-----	-----
Williams'-----	-----	-----	21.4	14	-----	-----	-----	-----	-----	-----
McMackin's Gourd Seed-----	-----	-----	20.1	18	29.9	7	17.8	20	-----	-----
Square Deal-----	-----	-----	15.9	19	-----	-----	-----	-----	-----	-----
Cocke's Prolific (Experiment Station Farm)-----	-----	-----	-----	-----	37.9	1	-----	-----	-----	-----
Thomas' Improved-----	-----	-----	-----	-----	33.1	2	-----	-----	-----	-----
Native-----	-----	-----	-----	-----	31.5	5	-----	-----	-----	-----
Hickory King (Virginia)-----	-----	-----	-----	-----	28.7	11	-----	-----	-----	-----
Shellem's Prolific-----	-----	-----	-----	-----	26.9	16	22.2	8	-----	-----

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CONTINUED.

EXPERIMENT STATION FARM.

Varieties Tested.	1903.		1904.		1905.		1906.		Averages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.
Peele's Prolific -----					26.4	17	17.3	22		
Eureka -----					25.4	18	17.6	21		
Southern Beauty -----							22.3	7		
Currituck -----							21.9	9		
Farmers' Favorite -----							20.3	17		
Battle's Prolific -----							20.0	19		

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1906.

EDGECOMBE FARM.

Varieties.	Rank According to the Following Characters.													
	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Cocke's Prolific (Edgecombe) -----	1	1	1	9	4	20	13	18	9	4	3	19	6	1
Weekley's Improved -----	2	2	7	6	7	23	10	21	6	2	11	17	16	2
Biggs' Seven Ear -----	3	3	20	5	8	27	5	26	5	1	3	10	30	2
Sanders' Improved -----	4	7	10	3	10	17	20	11	3	9	7	6	4	4
McMackin's Gourd Seed -----	5	11	14	2	11	3	17	14	2	17	10	3	7	6
Holt's Strawberry -----	6	8	15	5	8	1	14	17	5	28	6	2	1	9
Eureka -----	7	4	14	8	5	15	12	19	8	11	3	1	2	4
Marlboro Prolific -----	8	5	8	8	5	24	21	10	8	6	10	3	12	1
Cocke's Prolific (Tennessee) -----	9	6	5	7	6	22	27	4	7	8	4	4	11	2
American Queen -----	10	9	19	7	6	15	11	20	7	10	8	18	22	4
Currituck -----	11	12	18	8	5	9	15	16	4	13	5	14	13	4
Hickory King (Tennessee) -----	11	14	17	3	10	21	16	15	3	9	3	16	20	5
Williams' -----	12	11	9	6	7	11	21	10	6	18	6	7	5	1
Brake's -----	13	17	12	2	11	6	24	7	2	16	4	9	3	6
Shellem's Prolific -----	14	4	2	10	3	25	27	4	10	5	3	21	26	4
Hastings' Prolific -----	15	10	6	8	5	26	28	3	8	3	9	5	8	3
Southern Beauty -----	16	18	11	5	8	12	25	6	5	22	4	11	9	6
Mosby's Prolific -----	17	20	3	5	8	24	30	1	5	7	10	12	8	5
Boone County White (Indiana) -----	18	16	27	7	6	4	4	27	7	23	3	18	17	4
Peele's Prolific -----	19	19	23	6	7	7	8	23	6	20	7	13	15	3
Selection 77 -----	20	23	24	5	8	8	9	22	5	25	3	12	14	5
Iowa Silver Mine -----	21	27	25	2	11	9	7	24	2	20	2	25	28	7
Farmers' Favorite -----	22	24	19	7	6	16	19	12	7	19	4	13	10	4
Wilson's Success -----	23	28	26	3	10	18	6	25	3	12	5	8	6	5
Reid's Yellow Dent -----	24	25	30	7	6	13	1	30	7	14	3	22	27	5
Riley's Favorite -----	25	26	29	6	7	14	2	29	6	21	2	24	25	5
Battle's Prolific -----	25	21	16	8	5	10	23	8	8	15	3	16	23	5
Hickory King (Virginia) -----	26	29	22	1	12	19	26	5	1	16	3	22	19	5
Boone County Special -----	27	15	13	11	2	2	22	9	11	27	3	20	21	6
Boone County White (Tennessee) -----	28	13	4	12	1	5	29	2	12	24	3	15	24	6
Leaming Yellow -----	29	20	28	1	12	10	3	28	1	26	1	23	27	8
Thomas' Improved -----	30	22	21	11	2	---	18	13	11	---	4	16	18	2

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1906.
CONTINUED.

IREDELL FARM.

Varieties.	Rank According to the Following Characters.													
	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Weekley's Improved -----	1	1	10	22	2	15	9	21	21	3	7	7	5	1
American Queen -----	2	4	9	15	8	3	13	17	15	4	6	9	9	3
Farmers' Favorite -----	3	3	4	16	7	2	22	8	16	16	5	4	5	1
Williams' -----	4	2	2	18	5	1	25	5	18	9	6	5	3	4
Brake's -----	5	9	7	3	20	7	23	7	3	17	7	4	4	1
Marlboro Prolific -----	6	6	6	8	15	16	21	9	8	16	7	2	5	1
Cocke's Prolific (Edgecombe) -----	7	5	11	13	10	13	16	14	13	2	6	9	9	1
Hickory King (Va.) -----	8	10	5	5	18	14	24	6	5	13	5	6	5	7
Biggs' Seven Ear -----	9	8	19	9	14	19	8	22	9	1	6	5	9	4
Battle's Prolific -----	10	13	18	2	21	4	12	18	2	17	4	8	8	2
Thomas' Improved -----	11	11	13	8	15	7	17	13	8	10	5	9	7	4
Shellem's Prolific -----	12	14	14	8	15	18	15	15	8	5	5	5	5	3
Riley's Favorite -----	12	7	29	17	6	14	1	29	17	19	1	7	7	7
Southern Beauty -----	13	17	20	3	20	10	10	20	3	25	7	4	3	8
Boone County White (Tenn.) -----	14	11	21	17	6	9	6	24	17	18	5	5	7	6
Sanders' Improved -----	15	21	17	1	22	14	19	11	1	4	8	5	5	4
Selection 77 -----	16	16	24	12	11	9	2	28	12	8	3	5	7	5
Peele's Prolific -----	17	17	16	8	15	7	18	12	8	7	5	5	5	6
Currituck -----	18	18	1	8	15	5	29	1	8	25	9	6	5	7
Boone County White (Ind.) -----	19	15	22	20	3	12	7	23	20	15	5	7	7	6
Leaming Yellow -----	20	19	26	10	13	13	3	27	10	22	1	11	10	5
Hastings' Prolific -----	21	25	8	4	19	20	27	3	4	6	10	1	2	6
Cocke's Prolific (Tenn.) -----	21	23	18	6	17	17	20	10	6	12	7	6	7	2
Reid's Yellow Dent -----	22	24	27	7	16	8	3	27	7	20	4	8	7	6
Eureka -----	23	12	15	21	1	15	14	16	22	14	5	3	3	4
Holt's Strawberry -----	24	20	3	19	4	6	28	2	19	20	10	2	1	9
McMackin's Gourd Seed -----	25	24	12	14	9	12	26	4	14	22	8	4	3	8
Iowa Silver Mine -----	26	22	25	22	2	15	5	25	21	23	1	10	9	7
Mosby's Prolific -----	26	26	23	8	15	16	11	19	8	11	7	5	3	4
Boone County Specia -----	27	27	28	11	12	11	4	26	11	24	2	7	6	8

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1906. CONTINUED.

TRANSYLVANIA FARM.

Rank According to the Following Characters.

Varieties.	Rank According to the Following Characters.													
	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.	Shrinkage of Ears on Standing 66 Days.
Hickory King (Tenn.)-----	1	12	---	1	29	10	---	---	1	11	2	21	21	17
Cocke's Prolific (Edgecombe)-----	2	6	---	10	20	19	---	---	11	5	2	19	16	15
Holt's Strawberry-----	2	3	---	19	11	1	---	---	19	18	4	---	---	4
Sanders' Improved-----	3	5	---	17	13	15	---	---	18	8	4	5	5	7
Eureka-----	4	2	---	27	3	16	---	---	27	9	4	1	1	10
Weekley's Improved-----	5	3	---	23	7	21	---	---	23	2	3	23	13	21
Southern Beauty-----	6	15	---	5	25	11	---	---	5	11	3	9	18	6
Marlboro Prolific-----	7	11	---	8	22	18	---	---	8	7	4	4	3	10
McMackin's Gourd Seed-----	8	10	---	16	14	5	---	---	9	15	4	2	8	12
Peele's Prolific-----	9	8	---	19	11	4	---	---	19	18	3	13	20	2
Biggs' Seven Ear-----	10	9	---	18	12	25	---	---	19	1	3	8	6	16
Battle's Prolific-----	11	14	---	11	19	2	---	---	12	18	2	11	12	22
American Queen-----	12	7	---	25	5	22	---	---	25	4	3	13	14	5
Williams'-----	13	1	---	28	2	10	---	---	28	14	3	3	4	8
Thomas' Improved-----	14	8	---	23	7	13	---	---	23	13	2	17	17	1
Shellem's Prolific-----	15	16	---	14	16	20	---	---	15	6	2	25	19	23
Farmers' Favorite-----	16	13	---	20	10	2	---	---	20	24	3	12	22	11
Currituck-----	17	17	---	15	15	6	---	---	16	16	2	10	13	14
Boone County White (Tenn.)-----	18	23	---	9	21	9	---	---	10	18	2	20	25	16
Merrill (Native)-----	19	21	---	13	17	6	---	---	14	20	2	15	15	10
Brake's-----	20	24	---	6	24	3	---	---	6	17	3	7	7	16
Hickory King (Va.)-----	21	26	---	3	27	14	---	---	3	12	2	24	19	17
Hastings' Prolific-----	22	19	---	21	9	24	---	---	21	3	4	14	11	13
Boone County White (Ind.)-----	23	20	---	24	6	7	---	---	24	17	5	23	23	16
Cocke's Prolific (Transylvania)-----	24	22	---	26	4	8	---	---	26	22	2	26	24	8
Selection 77-----	25	25	---	21	9	11	---	---	21	19	2	22	25	14
Hamilton (Native)-----	26	27	---	13	17	10	---	---	14	21	1	30	27	18
Mosby's Prolific-----	27	28	---	12	18	19	---	---	13	10	4	6	2	3
Cocke's Prolific (Tenn.)-----	28	18	---	29	1	23	---	---	29	7	3	4	9	9
Riley's Favorite-----	29	30	---	2	23	12	---	---	2	19	5	28	29	20
Boone County Special-----	30	29	---	22	8	7	---	---	22	23	2	27	28	20
Iowa Silver Mine-----	31	31	---	16	14	14	---	---	17	17	1	31	30	1
Leaming Yellow-----	32	32	---	7	23	15	---	---	7	20	1	32	31	6
Reid's Yellow Dent-----	33	33	---	4	26	17	---	---	4	17	5	29	26	19

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1906. CONTINUED.

EXPERIMENT STATION FARM.

Varieties.	Rank According to the Following Characters.													
	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Biggs' Seven Year -----	1	1	10	4	5	16	4	21	9	1	11	12	9	2
Hickory King (Tennessee) -----	2	3	11	2	7	5	6	19	3	5	5	13	10	6
Cocke's Prolific (Edgecombe) -----	3	2	5	8	1	15	12	13	15	3	9	14	5	1
Marlboro Prolific -----	4	4	6	5	4	11	15	10	12	2	11	9	4	8
Boone County White (Indiana) -----	5	7	16	4	5	1	7	18	9	8	5	17	11	11
Boone County White (Tennessee) -----	6	6	14	6	3	2	9	16	13	11	7	16	12	10
Cocke's Prolific (Tennessee) -----	7	5	3	7	2	11	18	7	14	5	-----	3	2	5
Southern Beauty -----	7	10	11	2	7	6	14	11	4	9	10	8	7	12
Shellem's Prolific -----	8	8	13	3	6	9	11	14	6	2	8	20	11	13
Currituck -----	9	12	9	2	7	4	16	9	3	13	11	5	4	9
Reid's Yellow Dent -----	10	9	19	5	4	8	3	22	11	8	4	20	12	17
Iowa Silver Mine -----	11	11	21	5	4	10	2	23	10	8	3	19	14	18
Sanders' Improved -----	12	16	5	1	8	8	20	5	2	8	13	4	3	12
Selection 77 -----	13	13	18	5	4	7	8	17	10	7	5	6	10	16
Weekley's Improved -----	14	14	4	5	4	15	19	6	11	4	11	18	8	3
Boone County Special -----	15	15	17	5	4	2	10	15	10	12	7	11	12	13
Mosby's Prolific -----	16	20	2	1	8	12	21	4	1	6	-----	1	1	8
Leaming Yellow -----	16	18	22	3	6	14	1	24	5	6	1	22	15	4
Farmers' Favorite -----	17	17	15	5	4	2	13	12	11	10	7	5	6	5
Riley's Favorite -----	18	18	20	4	5	11	5	20	8	8	2	21	13	18
Battle's Prolific -----	19	19	12	4	5	3	7	18	7	16	6	15	11	14
McMackin's Gourd Seed -----	20	22	8	5	4	3	22	3	10	14	8	2	2	16
Eureka -----	21	21	1	8	1	13	24	1	16	11	12	7	2	7
Peele's Prolific -----	22	23	7	5	4	2	23	2	12	15	8	10	2	15

TABLE IV—COMPILED RESULTS OF VARIETY TESTS OF CORN, SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER.

EDGECOMBE FARM.

Varieties.	Number of Years Tested.	Rank According to the Following Characters.													
		Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Pounds of Ear Corn required to Shell Bushel Corn.	Prolificacy of Ears per Stalk. ¹	Earliness as Shown by Date of Silking. ¹	Height of Stalks. ²	Height of Ears. ²	
Holt's Strawberry -----	4	8	8	5	11	5	3	13	3	10	15	5	2	1	
Marlboro Prolific -----	4	4	3	7	13	3	14	10	6	12	6	7	4	8	
Sanders' Improved -----	4	3	4	8	1	15	10	11	5	1	5	6	7	4	
Cocke's Prolific (Edgecombe) -----	4	1	1	2	14	2	11	6	10	13	2	3	10	5	
Brake's -----	4	7	10	3	5	11	2	14	2	5	8	4	3	3	
Boone County White (Ind.) -----	4	9	9	12	10	6	1	4	12	9	11	3	11	10	
Cocke's Prolific (Tenn.) -----	4	5	5	4	12	4	12	12	4	11	4	4	1	6	
Weekley's Improved -----	4	2	2	6	9	7	15	9	7	8	1	8	8	9	
Iowa Silver Mine -----	4	13	14	11	3	13	9	8	8	4	9	2	14	14	
Leaming Yellow -----	4	11	12	13	4	12	6	5	11	2	14	1	13	15	
Selection 77 -----	4	6	7	10	7	9	5	2	14	7	13	3	6	7	
Boone County White (Tenn.) -----	4	10	6	9	15	1	4	7	9	14	12	3	9	11	
Reid's Yellow Dent -----	4	14	13	14	6	10	7	3	13	6	7	3	12	13	
Mosby's Prolific -----	4	15	15	1	2	14	13	15	1	3	3	7	5	2	
Riley's Favorite -----	4	12	11	15	8	8	8	1	15	8	10	2	15	12	

¹Results in these columns for the Edgecombe farm are from the date of 1906 only.²Results in these columns are from date of 1905 and 1906 only.

TABLE IV—COMPILED RESULTS OF VARIETY TESTS OF CORN, SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER—CONTINUED.

IREDELL FARM.

Varieties.	Rank According to the Following Characters.													
	Number of Years Tested.	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Pounds of Ear Corn Required to Shell Bushel Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Tasseling.	Height of Stalks.	Height of Ears. ¹
Cocke's Prolific (Tenn.) -----	4	3	2	4	12	1	10	8	5	12	3	7	3	4
Weekley's Improved -----	4	1	1	1	10	3	11	10	3	10	1	9	2	3
Mosby's Prolific -----	4	11	10	3	3	10	9	11	2	3	4	10	4	2
Boone County White (Tenn.) -----	4	4	3	6	9	4	5	6	7	6	9	5	8	6
Holt's Strawberry -----	4	8	6	2	11	2	1	12	1	11	11	8	1	1
Riley's Favorite -----	4	7	5	11	6	7	6	1	12	7	8	2	10	9
Sanders' Improved -----	4	2	5	4	1	12	8	9	4	1	2	8	5	5
Selection 77 -----	4	6	5	9	7	6	3	3	10	8	5	4	7	7
Reid's Yellow Dent -----	4	9	9	5	2	11	2	7	6	2	7	3	9	10
Leaming Yellow -----	4	7	7	8	4	9	7	4	9	4	6	2	12	12
Iowa Silver Mine -----	4	10	8	10	5	8	4	2	11	5	8	1	11	11
Boone County White (Ind.) -----	4	5	4	7	8	5	2	5	8	9	10	6	6	8

¹Results in this column are from date of 1904, 1905 and 1906.

TABLE IV—COMPILED RESULTS OF VARIETY TESTS OF CORN, SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGES OF GRAIN, COB, EARS AND STOVER—CONTINUED.

EXPERIMENT STATION FARM.

Varieties.	Number of Years Tested.	Rank According to the Following Characters.												
		Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Pounds of Ear Corn Required to Shell Bushel Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.
Cocke's Prolific (Edgecombe) -----	4	1	1	4	10	1	11	8	5	9	2	7	2	4
Sanders' Improved -----	4	2	2	3	1	10	5	9	4	1	5	9	4	3
Leaming Yellow -----	4	3	3	12	4	7	6	1	12	4	9	1	11	12
Reid's Yellow Dent -----	4	3	4	10	3	8	2	2	11	3	10	4	9	9
Weekley's Improved -----	4	4	5	5	8	3	12	10	3	8	1	8	8	5
Selection 77 -----	4	5	7	7	7	4	4	6	7	7	6	5	5	6
Cocke's Prolific (Tenn.) -----	4	6	6	1	9	2	9	11	2	10	3	---	1	2
Boone County White (Tenn.) -----	4	7	9	8	6	5	1	5	8	6	11	6	6	7
Boone County White (Ind.) -----	4	7	8	6	6	5	3	7	6	6	7	5	7	8
Riley's Favorite -----	4	8	10	11	3	8	7	3	10	3	9	2	10	10
Mosby's Prolific -----	4	8	12	2	2	9	10	12	1	2	4	---	3	1
Iowa Silver Mine -----	4	9	11	9	5	6	8	4	9	5	8	3	12	11

COMMENTS ON VARIETY TESTS OF CORN.

The variety tests were conducted this year at the Edgecombe, Iredell, Transylvania, and Experiment Station farms. The land at the Edgecombe farm devoted to this test was good bottom-land, containing much organic matter and which had a heavy growth of cow-peas on it the previous season, which were cut for hay, while at Iredell a fine brownish clay soil with a red-clay subsoil was used. These experiments at Transylvania were on a clayey loam soil located in the French Broad River bottom, which is subject to overflow during very high tides, and which is of fairly uniform character through both soil and subsoil, and capable of fair yields without fertilizers. The land was in cabbage and Irish potatoes the previous year, which had been fertilized with a moderate application of commercial high-grade fertilizer and stable manure. This land being about seven feet above the average water-level of the river, was fairly well drained. A clay loam with a red-clay subsoil, both containing many rock fragments, was used at the Experiment Station farm; putting the tests on the same piece of land during 1904, 1905, and 1906. The land at all the places was tolerably level and uniform in character. To eliminate all inequalities in the character of the land, if any, the designated varieties at the different farms were planted each in separate rows, arranged consecutively, and this plan was repeated from two to four times, varying with the length of the rows, in order to give the desired acreage to each variety. The varieties are arranged in Table I in the order of their productivity of shelled corn per acre; also the rank in yield of stover per acre is indicated in the second column. In Table II is brought together the results of varietal tests obtained at the Edgecombe farm during 1900, 1901, 1902, 1903, 1904, 1905, and 1906, at Red Springs in 1900 and 1901, and at Statesville during 1903, 1904, 1905, and 1906; at Transylvania during 1906, and at Experiment Station during 1903, 1904, 1905, and 1906. Results from the testing of varieties of corn were first obtained at the Transylvania farm during this year. The growth of the varieties were fairly good throughout the season, after their recovery from a killing frost on May 10. Much, or almost all, of the corn was so badly frosted that it fell down and was apparently dead, and much of it never recovered, but a large part of it was up and growing again by May 19, when it was cultivated. There was at all times a noticeable difference in the growth and appearance of the different varieties. Each had a splendid color throughout the growing season. Coeke's Prolific from Tennessee-grown seed and Eureka were remarkable throughout the season for their vigorous growth. The lower blades, especially, of all the late and medium late maturing varieties, seem to have been severely affected by rot, but in no case was there any noticeable "firing." It was not observed that there was any difference in tendency of the

ears of the several varieties to rot, unless, perhaps, the earlier ones were less affected; however, this may have been due to season. The vigorousness in growth, prolificacy, largeness of ears, percentages of grain and stover, yields, etc., of all varieties tested at the different farms are shown in Tables I, II, III, and IV.

At the Transylvania farm a shrinkage test was made of the ears of the different varieties when stored in the barn in burlap bags for 66 days. These results are on page 11.

By consulting Table II, it will be seen that the difference in yield of shelled corn per acre, on the different farms during the period covered by the tests between the variety yielding the highest and the one the lowest in the individual tests have ranged all the way from 6.2 to 26.6 bushels of shelled corn at the Edgecombe farm during the past seven years, with the number of varieties in the different tests varying from eight to thirty-two; from 7.7 to 14 bushels at Red Springs, when using nine varieties for each of two years; from 12.1 to 13.5 bushels during four years at Iredell, where from nineteen to thirty-one varieties were employed, from 8.8 to 14 bushels at the Experiment Station farm during four years with the number of varieties ranging from nineteen to twenty-four; and a difference of 24.8 bushels at Transylvania during the past year, where thirty-four varieties were planted.

Tables III and IV will be found to contain much valuable data in plain, compact form relative to the different characters of corn when grown under widely varying soil and climatic conditions. A careful study of these tables should be made by every corn-growing reader.

Table II also gives the average standing of all the varieties, at each farm, that have been tested continuously since the beginning of the work in the different localities. The varieties which have averaged the highest yields of shelled corn at the different farms are: At Edgecombe during seven years, Cocke's Prolific, Weekley's Improved, Sanders' Improved, and Holt's Strawberry; at Red Springs during two years, Native, Cocke's Prolific, Holt's Strawberry, and Weekley's Improved; at Iredell, Weekley's Improved, Sanders' Improved, Cocke's Prolific, and Boone County White; and at Experiment Station, Cocke's Prolific, Sanders' Improved, Leaming Yellow, Reid's Yellow Dent, and Weekley's Improved.

SOME NOTES ON VARIETIES OF CORN TESTED IN 1906.¹

Cocke's Prolific, from Edgecombe-grown seed, ranked second in 1900, 1901, and 1904, and first in 1902, 1903, 1905, and 1906, at the Edgecombe farm; at Red Springs it stood fifth in 1900 and third in 1901; at Iredell, from Edgecombe-grown seed, sixth in 1904, first

¹ The basis of rank in these notes is according to the yield of bushels of shelled corn per acre.

in 1905, and seventh in 1906; at Experiment Station, third in 1903, 1904, 1905, and 1906; and second in 1906 at Transylvania farm.

The yield from Tennessee-grown seed of this variety at Edgecombe was seventh in 1903, twelfth in 1904, fourteenth in 1905, and ninth in 1906; fourteenth in 1904, tenth in 1905, twenty-first in 1906 at the Iredell; fourth in 1903, seventeenth in 1904, eighteenth in 1905, and seventh in 1906 at Experiment Station; and twenty-eighth in 1906 at Transylvania. From Experiment Station-grown seed, first in 1905 at Experiment Station; and at Transylvania, from seed grown at this farm two years and originally from the Edgecombe farm, Cocke's Prolific ranked this year in twenty-fourth place at Transylvania.

The results of comparative varietal tests conducted during the past seven years on the Test Farms indicate this to be a most substantial and reliable variety; in fact, one of the best varieties thus far tested for growth on the sandy loam soils of the eastern portion of the State. One defect, however, with this variety is that the grains are too short.

Weekley's Improved is a very good variety, having ranked first and second at the Iredell and Edgecombe farms as an average of four and seven years' trials, respectively. It is tolerably early in maturity and can be grown with more safety than most of the other varieties when only a short growing period is afforded. At the Edgecombe farm it ranked in 1900 third, in 1901 first, in 1902, 1905, and 1906 second, but in 1903 and 1904 fell down to tenth and thirteenth places respectively. In 1901 it was first at Red Springs; and in 1903 sixth, in 1904 tenth, in 1905 second, and in 1906 first at Iredell; in 1903 fifth, in 1904 tenth, and in 1906 thirteenth at Experiment Station; and in 1906 fifth at Transylvania. This variety has a little smaller ear and cob than Cocke's Prolific.

Sanders' Improved, from Georgia-grown seed, ranked fourth in 1900, third in 1901, fourth in 1902 and in 1906, seventeenth in 1903, third in 1904 and fourth in 1905 at the Edgecombe farm; sixth in 1901 at Red Springs; and tenth in 1903, ninth in 1904, thirteenth in 1905 and fifteenth in 1906 at Iredell; first in 1903, second in 1904, fourth in 1905 and twelfth in 1906 at Experiment Station; and third in 1906 at Transylvania. This variety produces an ear about the size of Cocke's Prolific, but contains a smaller cob by about three to six per cent, and consequently requires about three to five pounds less of corn-on-the-ear, as shown by an average of the result of the past seven years, to shell a bushel of corn.

Holl's Strawberry occupied first place in 1900, sixth in 1901, 1902, and 1906, fifteenth in 1903, twenty-fifth in 1904, and seventh in 1905 at the Edgecombe farm; ninth in 1900 and second in 1901 at Red Springs; eighth in 1903, sixteenth in 1904, nineteenth in 1905 and twenty-fourth in 1906 at Iredell; ninth in 1903, sixth in 1904, twenty-first in 1905 at Experiment Station; and second in 1906 at

Transylvania. It has a much larger ear than Cocke's Prolific and produces a larger percentage of stover.

Brake's, as a result of four years' tests in Edgecombe, the home of the variety, ranked eleventh in 1902, nineteenth in 1903, seventh in 1904, thirteenth in 1905 and 1906. At Iredell it occupied first place in the tests of 1904, seventh in 1905 and fifth in 1906; and twentieth at Transylvania in 1906. This variety has a short large ear.

Leaming Yellow ranked twelfth in 1902, fourth in 1903, fifteenth in 1904, twenty-first in 1905 and twenty-ninth in 1906 at the Edgecombe farm; and twelfth in 1903, fourteenth in 1904, twenty-first in 1905 and twenty-first in 1906 at Iredell; seventh in 1903, fourth in 1904, eighth in 1905 and sixteenth in 1906 at Experiment Station; and thirty-second at Transylvania in 1906. This is a yellow corn that has a strong tendency to produce only one large ear per stalk. It has yielded excellent results in Indiana, Iowa, and Illinois in comparison with other varieties.

Selection 77, from Ohio-grown seed, ranked fifth, sixteenth, eighth, and twentieth at Edgecombe, and eleventh, twelfth, twenty-fifth and sixteenth at Iredell in 1903, 1904, 1905, and 1906 respectively; tenth, seventh, twelfth and thirteenth in 1903, 1904, 1905, and 1906, at Experiment Station; and twenty-fifth in 1906 at Transylvania. This corn has a larger ear and a little greater percentage shelling capacity than Cocke's Prolific.

Riley's Favorite, from Indiana-grown seed, ranked ninth, eighteenth, eighteenth and twenty-fifth at the Edgecombe farm; eighth, twenty-second, twenty-seventh and twelfth at Iredell in 1903, 1904, 1905, and 1906, respectively; fourteenth, fourth, fifteenth, and eighteenth in 1903, 1904, 1905, and 1906, at Experiment Station; and twenty-ninth in 1906 at Transylvania. This is a yellow corn with tolerably small and narrow grains. It has a somewhat larger ear than Cocke's Prolific. This is an early-maturing variety.

Boone County White, from Indiana-grown seed, stood in 1903, 1904, and 1906 eleventh, twenty-third, and eighteenth at Edgecombe, and fifteenth in 1903, eighth in 1904, fourteenth in 1905, and nineteenth in 1906 at Iredell; sixteenth, twelfth, tenth, and fifth in 1903, 1904, 1905, and 1906, at Experiment Station; and eighteenth in 1906 at Transylvania; while from Tennessee-grown seed it ranked thirteenth, seventeenth, ninth, and twenty-eighth at Edgecombe in 1903, 1904, 1905, and 1906; seventh in 1904, thirtieth in 1905, and fourteenth in 1906 at Iredell; twelfth in 1903, ninth in 1904, fourteenth in 1905, and sixth in 1906 at Experiment Station; and twenty-third in 1906 at Transylvania. This is a large white-eared variety.

Reid's Yellow Dent, from Illinois-grown seed, ranked twelfth at both the Edgecombe and Iredell farms in 1903, eighteenth and nineteenth in 1904, twenty-third and twentieth in 1905, and twenty-

fourth and twenty-second in 1906, respectively; eighth in 1903, second in 1904, twelfth in 1905, and tenth in 1906 at Experiment Station; and thirty-third in 1906 at Transylvania. This is a yellow variety of corn that has done well in the Northwestern States, but has a strong tendency, when grown under southern conditions, as indicated by our variety tests, to produce only one large ear per stalk and smaller yields per acre than the two-eared varieties. It is medium early in maturity.

Marlboro Prolific, in 1903 at the Edgecombe and Iredell farms, ranked thirteenth and third, respectively, in 1904 second at Edgecombe, in 1905 eleventh at Edgecombe and twelfth at Iredell, and in 1906 eighth at Edgecombe and sixth at Iredell; second in 1903, sixth in 1905, and fourth in 1906 at Experiment Station; and seventh in 1906 at Transylvania. This variety has an ear a little larger in size than Coker's Prolific and has a decided strong tendency to bear more than one ear to each stalk.

Iowa Silver Mine, from Illinois seed, ranked fourteenth at both Edgecombe and Iredell farms in both 1903 and 1904, twenty-fourth at both in 1905, and twenty-first in 1906 at Edgecombe, and twenty-sixth in 1906 at Iredell; thirteenth, sixteenth, sixteenth, and eleventh in 1903, 1904, 1905, and 1906 at Experiment Station and thirty-first in 1906 at Transylvania. This is a white large-eared corn that has a smaller percentage of cob to grain than Coker's Prolific. Its grains are well shaped, showing the effect of prolonged and intelligent breeding and selection. This is one of the earliest varieties which the Department has tested.

Mosby's Prolific, from Mississippi-grown seed, ranked fifth in 1900, twelfth in 1903, eighteenth in 1904, twenty-second in 1905, and seventeenth in 1906, at Edgecombe; third in 1900 at Red Springs; seventh in 1903, eighteenth in 1904, thirty-first in 1905, and twenty-sixth in 1906 at Iredell; sixth in 1903, thirteenth in 1904, twentieth in 1905, and sixteenth in 1906 at Experiment Station; and twenty-seventh in 1906 at Transylvania. It has a large proportion of stalk to ear, as it has a large stalk.

Williams' ranked in 1904 fourth and fifteenth, in 1905 twenty-first and fifth, and in 1906 twelfth and fourth at Edgecombe and Iredell, respectively; fourteenth in 1904 at Experiment Station; and thirteenth in 1906 at Transylvania. This variety has a large, tall stalk and large ears that contain a medium high percentage of cob, especially when grown at Iredell. It seems better suited to bottom than upland.

Boone County Special stood ninth and sixteenth in 1904, sixteenth and fifteenth in 1905, and twenty-seventh and twenty-seventh in 1906, respectively, at the Edgecombe and Iredell farms; fifth in 1904, ninth in 1905, and fifteenth in 1906 at Experiment Station and thirtieth in 1906 at Transylvania. The ears are rather below the medium in

size. It, with Boone County White (Tenn.), Iowa Silver Mine, Leaming Yellow and Riley's Favorite, were the earliest maturing varieties at the Iredell farm this year.

McMackin's Gourd Seed, in shelled corn, was nineteenth, fifteenth, and fifth at Edgecombe; twentieth, twenty-eighth, and twenty-fifth at Iredell in 1904, 1905, and 1906, respectively; eighteenth, seventh, and twentieth in 1904, 1905, and 1906 at Experiment Station; and eighth in 1906 at Transylvania. Medium in date of maturity.

Currituck, which is grown rather extensively in some sections of the Piedmont Plateau of North Carolina, ranked in 1904, 1905, and 1906 twenty-second, twenty-third, eleventh, and eleventh, twenty-second, eighteenth at the Edgecombe and Iredell farms, respectively; in 1906 ninth at Experiment Station; and in 1906 seventeenth at Transylvania. Its ears are large and contain a medium high percentage of cob to grain. The results at the Iredell farm this year indicate it to be a rather late maturing variety.

Shellem's Prolific ranked at Iredell seventeenth in 1904, tenth in 1905, and twelfth in 1906; at Edgecombe, nineteenth in 1905, and fourteenth in 1906; at Experiment Station, sixteenth in 1905, and eighth in 1906; and fifteenth at Transylvania in 1906. It has a small ear and is early when grown in Western North Carolina.

Eureka ranked twelfth in 1905, and seventh in 1906, at Edgecombe; twenty-sixth in 1905, and twenty-third in 1906, at Iredell; nineteenth in 1905 and twenty-first in 1906 at Experiment Station; and fourth in 1906 at Transylvania. This variety has a white ear with a comparatively high percentage of cob to grain.

Hickory King, from Tennessee-grown seed, ranked ninth in 1901, sixth in 1903 and 1905, and eleventh in 1906, at Edgecombe; thirteenth in 1903, sixth in 1905, and eighth in 1906, at Iredell; eighth in 1901 at Red Springs; eleventh in 1903, sixth in 1905, and second in 1906, at Experiment Station; and first in 1906 at Transylvania. From Virginia-grown seed it stood tenth in 1905 and twenty-sixth in 1906 at Edgecombe; eleventh in 1905 at Iredell; eleventh in 1905 at Experiment Station; and twenty-first in 1906 at Transylvania. This is a prolific variety with small ears and broad and shallow grains.

Thomas' Improved ranked fourteenth in 1904, fourth in 1905, and eleventh in 1906, at Iredell; third in 1905 and thirtieth in 1906 at Edgecombe; second in 1905 at Experiment Station; and fourteenth in 1906 at Transylvania. This is a vigorous rank-growing variety that matures rather late.

Peele's Prolific stood eighteenth in 1905 and nineteenth in 1906 at Edgecombe; seventeenth in 1905 and 1906 at Iredell; seventh in 1905 and twenty-second in 1906 at Experiment Station; and ninth in 1906 at Transylvania.

American Queen occupied third place in 1905, and second in 1906 at Iredell; tenth in 1906 at Edgecombe; and twelfth in 1906 at Transylvania.

Square Deal, in 1904 and 1905, ranked sixth and seventeenth at Edgecombe, and twenty-first and twenty-third at Iredell; and nineteenth in 1904 at Experiment Station.

Hastings' Prolific ranked in this year's tests fifteenth at Edgecombe, twenty-first at Iredell and twenty-second at Transylvania.

Southern Beauty, in this year's tests, stood sixteenth at Edgecombe, thirteenth at Iredell, seventh at Experiment Station, and sixth at Transylvania.

Farmers' Favorite ranked in this year's tests twenty-second at Edgecombe, third at Iredell, seventeenth at Experiment Station and sixteenth at Transylvania.

Wilson's Success stood this year twenty-third at Edgecombe.

Biggs' Seven Ear ranked third in 1903, first in 1904 and third in 1906 at Edgecombe; first in 1903, second in 1904, and ninth in 1906 at Iredell; first in 1904 and 1906 at Experiment Station, and tenth in 1906 at Transylvania. This is one of the best varieties that has been tested. It is decidedly the most prolific variety thus far grown on the test farms.

Battle's Prolific stood in this year's test twenty-fifth at Edgecombe, tenth at Iredell, nineteenth at Experiment Station and eleventh at Transylvania.

Hamilton (native) ranked twenty-sixth this year at Transylvania.

Merrill (native) ranked nineteenth this year at Transylvania.

STUDY OF COMPILED RESULTS OF VARIETY TESTS OF CORN.

During the past seven years on the Test Farms of the Department something over fifty varieties of corn have been studied in comparative field tests. The number of varieties in the different tests have ranged all the way from eight in 1900 to thirty-two in 1906. The different tests of varieties at the several farms were grown as nearly under the same condition of soil, fertilization and cultivation as it was possible to provide. To eliminate all inequalities in the character of the land, if any, the varieties at the different farms were planted each in separate rows, arranged consecutively, and this plan was repeated from three to four times, varying with the length of the rows, in order to give the desired acreage to each variety. By taking these precautions the results obtained should be reliable and highly valuable.

WHAT IS A VARIETY?

A variety is supposed to represent in a general way a class of plants with one or more distinguishing characteristics, but with a

cereal like corn, which crosses so readily, variety does not signify much unless proper precautions have been exercised in its growth.

Take some variety of corn, say Cocke's Prolific, that has been bred carefully and intelligently through a number of years for high yield of shelled corn per stalk, and grow it continuously in or adjacent to a field of inferior corn, and in a very short time, especially if proper seed selection is not practiced, it will give much smaller yields, when grown under the same conditions, than the original pure-bred corn; this being due to the fact that you no longer have pure Cocke's Prolific, but a mixture of "scrub" and Cocke's Prolific corn. This fact emphasizes the importance of securing seed from reliable parties.

EARLY MATURING VARIETIES.

Iowa Silver Mine, Riley's Favorite, Leaming Yellow, Reid's Yellow Dent, Boone County Special and Boone County White are six of the earliest varieties in maturing that have thus far been tested on the farms of the Department. These were all originated in the northern central States, where they have been accustomed to a comparatively short growing season, which accounts largely for their inherent tendency to early maturity when grown under North Carolina conditions. Earliness, however, we do not consider an important requisite with corn for this climate, except, possibly, where corn is grown in the mountainous section of the State, or where corn, of necessity, has to be planted late, after the maturity of some crop like Irish potatoes or other truck crop. Under these circumstances it may be well to use one of the varieties mentioned above, especially if experience has taught the farmer that local varieties do not thoroughly mature before frost.

MEDIUM MATURING VARIETIES.

Biggs' Prolific, Craig's Prolific White, Cocke's Prolific, and Craig's Prolific Strawberry mature at a medium date in the fall, and some of these are our most prolific varieties. All these will mature on the different types of soil of the State, if planted before July 1.

LATE MATURING VARIETIES.

It has been found that Holt's Strawberry, Marlboro Prolific, Sanders' Improved, Weekley's Improved, and Mosby's Prolific are the latest maturing varieties tested during the past four years. These varieties generally produce a large and tall stalk when grown under conditions as represented by the Iredell Farm, *i. e.*, the results of the past four years' tests at that place indicate as much.

VARIETIES ADAPTED TO THE EAST SECTION.

A study of the results of the variety tests conducted at the Edgecombe Farm during the past seven years indicates that the varieties of corn best suited to the fine loamy soils of the eastern and southwestern parts of the State are Cocke's Prolific, Biggs' Seven Ear, Weekley's Improved, Marlboro Prolific, Craig's Prolific Strawberry, Sanders' Improved, and Holt's Strawberry, in about the order in which they are arranged. Cocke's Prolific and Biggs' Seven Ear have proven exceedingly promising varieties. All these varieties, except Holt's Strawberry and Craig's Prolific Strawberry, are white and prolific, and produce medium to small ears.

VARIETIES ADAPTED TO PIEDMONT AND MOUNTAIN SECTIONS.

It has been found from a testing of thirty-eight varieties during the past four years at the Iredell and Experiment Station farms located in different parts of the Piedmont section that Weekley's Improved, Biggs' Seven Ear, Craig's Prolific White, Cocke's Prolific, Sanders' Improved, Hickory King, Holt's Strawberry, Boone County White, Leaming Yellow, and Reid's Yellow Dent, are the largest yielders of shelled corn per acre of all the varieties thus far tested. These, too, are all white varieties and are medium to medium-late in maturity. The best of the varieties tested at the western farm are almost the same as for the east, but the order of prolificacy is somewhat different.

CORRELATION OF CHARACTERS OF VARIETIES OF CORN. -

One of the purposes of our detailed study of varieties of corn, exhibited in Tables I, II, III, and IV, is to ascertain what characters, being mutually helpful and hence conducive of greater yields, may be expected to be found combined in the same variety, and what ones, being generally antagonistic, seldom or never occur in the same plant or group of plants. This knowledge is of the most fundamental importance in the proper production of not only corn but all other agricultural crops, as one being familiar with these facts will be better enabled to originate, improve or select varieties best adapted to different localities, soils and purposes. It is also felt that a more correct interpretation can be placed on the results obtained in variety tests.

In Table IV are brought together the average results of the work of four years (1903-'04-'05-'06) at the Edgecombe and Iredell farms separately. From a detailed study of this table, supplemented by field observations, the following tentative inductions are made with reference to varieties of corn studied when they are grown under conditions of soil and climate as represented by these two farms.

Antagonistic Characters.—(1) Earliness in maturity, other things being equal, is not generally conducive to large yields of grain and

stover. (2) Large-eared varieties usually have a low percentage of grain to cob and are as a rule less productive of shelled corn per acre. (3) Ears with very small cob have poorly-shaped kernels and give a small amount of shelled corn per ear, and *vice versa*. (4) Kernels of low vitality do not tend to the growth of plants of maximum yields.

Associated Characters.—(1) Earliness, other things being equal, usually tends to high percentage of ear to stover, and *vice versa*, although this ratio is more or less modified by season, soil, fertilization and breeding. (2) Varieties producing two ears per stalk are generally more productive of shelled corn per acre than those bearing only one ear, although it may be a large one. (3) Medium maturity, other things being equal, tends to increase yields per acre of grain. (4) Small kernels usually possess low vitality. (5) Kernels with small germs (chits) contain a small percentage of oil or fat. (6) Varieties with good root and leaf development are usually the most resistant ones to drought and disease and insect ravages.

SELECTING SEED FOR IMPROVEMENT.

In the improvement of corn by seed selection an endeavor should be made to start with the best variety as ascertained by actual tests in the field through a sufficient number of years to eliminate weather conditions. It must be borne in mind that in all plant improvement the same principles and practices that have been employed with such striking results in the improvement of the different breeds of animals must be followed.

For corn there are three general methods of improvement: First, by importation of seed from some reputable breeder or grower; second, by the careful selection of seed corn from one's own field or from a neighbor's; third, by careful selection and growing of seed corn in a field isolated something like four or five hundred yards from any other cornfield.

The characters that should be taken into account in the improvement of corn by selection are:

(1) Selection of ears from stalk bearing two or more ears, as it has been demonstrated time and again that a variety that bears two medium-sized ears per stalk will generally give higher yields of shelled corn per acre than a variety bearing one large ear to the stalk.

(2) The stalk should be large at the base and tapering gradually towards the tassel, for two reasons: First, because it will be better enabled to withstand drought, and, second, because it will stand up better in wind-storms.

(3) The ears should by all means be of a cylindrical form, with both butts and tips filled out, as this is the form that gives the highest percentage of yield of shelled corn per ear, other things being equal.

(4) The best-shaped kernel is a medium wedge, as this fills out the space on the cob most completely. Also, the distance between the rows of grains should be small, while the number of rows should be large and run parallel the full length of the cob, with little or no diminution in size, either at the butts or tips. The percentage of grains should be from 80 to 90 and should be held rigidly by the cob. It should also possess a high (90 to 95 per cent) germinating power and great resisting power to disease and insect ravages.

It should be kept clearly in mind that, with varieties of corn, selection should be made particularly with reference to total yield of shelled corn and the characters which tend to give this and an improved quality of grains. If it is to be used in feeding growing animals, or to be ground into meal for human consumption, it should be high in flesh and muscle forming material (protein); if for fattening stock, high in fat, and if to manufacture whiskey, alcohol or starch, high in starch, sugar, etc. (carbohydrates).

SOURCES OF VARIETIES OF CORN TESTED.

The seed used in the variety tests of corn at the Edgecombe, Iredell, Transylvania and Experiment Station farms this year were obtained from the following sources:

American Queen.....	R. P. Dalton, Winston, N. C.
Battle's Prolific.....	F. G. Battle, Durham, N. C.
Boone County Special (Illinois)....	Bureau of Plant Industry, Washington, D. C.
Boone County White (Tennessee)....	Bureau of Plant Industry, Washington, D. C.
Boone County White (Indiana)....	Bureau of Plant Industry, Washington, D. C.
Brake's.....	Joe L. Brake, Rocky Mount, N. C.
Coeke's Prolific.....	Edgecombe Test Farm, Rocky Mount, N. C.
Coeke's Prolific (Tennessee).....	Bureau of Plant Industry, Washington, D. C.
Coeke's Prolific.....	Transylvania Test Farm, Blantyre, N. C.
Craig's Prolific White.....	W. R. Craig, Sanford, N. C.
Currituck.....	Thomas Wooten, Statesville, N. C.
Eureka.....	T. W. Wood & Sons, Richmond, Va.
Farmers' Favorite.....	A. Cannon, Horse Shoe, N. C.
Hamilton (native).....	L. C. Hamilton, Blantyre, N. C.
Hastings' Prolific.....	H. G. Hastings & Co., Atlanta, Ga.
Hickory King (Virginia).....	A. O. Lee, Bartee, Va.
Hickory King (Tennessee).....	Bureau of Plant Industry, Washington, D. C.
Holt's Strawberry.....	T. W. Wood & Sons, Richmond, Va.
Iowa Silver Mine (Illinois).....	Bureau of Plant Industry, Washington, D. C.
Leaming Yellow (Ohio).....	Bureau of Plant Industry, Washington, D. C.
Marlboro Prolific (South Carolina) ..	Bureau of Plant Industry, Washington, D. C.
McMackin's Gourd Seed (Tennessee) ..	Bureau of Plant Industry, Washington, D. C.
Mosby's Prolific (Mississippi).....	Bureau of Plant Industry, Washington, D. C.
Merrill (native).....	S. N. Merrill Blantyre, N. C.
Peele's Prolific.....	Albert Peele, Guilford College, N. C.
Poole's.....	J. C. Poole, Marion, N. C.
Reid's Yellow Dent (Illinois).....	Bureau of Plant Industry, Washington, D. C.
Riley's Favorite (Indiana).....	Bureau of Plant Industry, Washington, D. C.
Sanders' Improved (Georgia).....	Bureau of Plant Industry, Washington, D. C.
Selection 77 (Ohio).....	Bureau of Plant Industry, Washington, D. C.
Shellem's Prolific.....	George Shellem, Raleigh, N. C.
Southern Beauty.....	L. A. Strupe, Tobaccoville, N. C.

Square Deal.....	Square Deal Seed Corn Farm, Cook, La.
Thomas' Improved.....	R. P. Thomas, Cofield, N. C.
Weekley's Improved.....	Iredell Test Farm, Statesville, N. C.
Williams'.....	C. S. Williams, Franklinton, N. C.

RESULTS OF VARIETY-DISTANCE TESTS OF CORN.

The results of these tests are included in the following tables:

TABLE V—RESULTS OF TESTS OF THREE LEADING VARIETIES OF CORN AT DIFFERENT SPACING IN THE ROWS IN 1906.

IREDELL FARM.

Varieties.	Yield, Height of Stalks and Ears at Different Spacing of Stalks in Four-foot Rows.									
	20 Inches.		24 Inches.		30 Inches.		36 Inches.		40 Inches.	
	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity. Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity. Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity. Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity. Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity. Yield in Bushels of Shelled Corn per Acre.
Cocke's Prolific -----	114	54 47.9	132	66 35.4	120	54 37.6	123	54 29.0	120	54 26.1
Holt's Strawberry -----	123	60 38.7	123	60 31.3	126	60 35.1	123	60 25.0	120	60 21.6
Weekley's Improved -----	132	66 36.2	126	60 32.6	132	66 32.9	120	51 26.0	117	54 22.7

TABLE VI—COMPILED RESULTS OF TWO YEARS' TESTS OF THREE LEADING VARIETIES OF CORN AT DIFFERENT SPACING IN THE ROWS.¹

EDGECOMBE FARM.

Varieties.	Yield, Height of Stalks and Ears at Different Spacing of Stalks in Four-foot Rows.														
	20 Inches.			24 Inches.			30 Inches.			36 Inches.			40 Inches.		
	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.
Cocke's Prolific -----	120.0	61.5	27.3	115.0	65.0	35.6	125.9	67.8	38.3	122.9	63.8	27.0	125.4	58.5	30.1
Holt's Strawberry -----	126.5	63.8	17.7	130.2	64.0	23.5	131.2	66.8	22.3	131.6	63.8	23.1	129.0	67.0	25.7
Weekley's Improved -----	107.8	53.0	28.5	120.9	63.0	32.7	122.9	64.8	38.7	125.0	66.5	38.7	119.0	58.8	34.7

IREDELL FARM.

Cocke's Prolific -----	118.5	55.5	42.0	126.0	60.0	34.4	120.0	54.0	39.2	124.5	55.5	36.5	121.5	54.0	34.5
Holt's Strawberry -----	127.5	66.0	31.6	124.5	66.0	30.7	123.0	64.5	34.8	118.5	66.0	29.6	120.0	63.0	30.7
Weekley's Improved -----	129.0	64.5	33.3	126.0	61.5	34.7	130.5	63.0	33.0	123.0	55.5	35.0	120.0	57.0	31.8

¹Results in this table for the Edgecombe farm were obtained from data of 1905 only.

These tests were only conducted at the Iredell farm during this year on a deep red rather open clay soil, which was underlaid with a tenacious red-clay subsoil. Both the soil and subsoil contain rock fragments. The tests were planned and put out last year and continued this to ascertain if the claim made by some that if distance is given the large one-eared varieties they will produce larger yields of shelled corn per acre than those producing or tending to produce two small or medium-sized ears per stalk. For the test, as is seen above, two well-known prolific varieties—Cocke's Prolific and Weekley's Improved—are being compared with Holt's Strawberry, one of the best one-eared varieties. It will be noted that both Cocke's Prolific and Weekley's Improved have each, as an average of two years' results at Iredell and one year's results at Edgecombe, made larger yields than Holt's Strawberry, at both farms and at all the different distancing of the hills in the rows that were tried.

At the Edgecombe farm in 1905 Cocke's Prolific produced the following increase of bushels of shelled corn over Holt's Strawberry: At 20 inches, 9.6; at 24 inches, 12.1; at 30 inches, 14.0; at 36 inches, 3.9; at 40 inches, 4.0 bushels; while at Iredell the increased yields as an average of the results of 1905 and 1906 were 10.4, 3.7, 4.4, 6.9, and 3.8 bushels per acre at the respective distances.

Weekley's Improved increased yields over Holt's Strawberry were: At Edgecombe in 1905 10.8 bushels at 20 inches, 9.2 at 24 inches, 16.4 at 30 inches, 15.6 at 36 inches, and 9.0 at 40 inches; while at Iredell as an average of two years the increases were 1.7, 4.0, 3.2, 5.4, and 1.1 bushels.

In the light of these results, coupled with five years' variety tests, it is evident that the largest yields of shelled corn per acre on any type of soil are going to result generally from the use of the more prolific varieties, because they will produce more shelled corn per stalk, and, as the stalks are generally smaller and can be planted closer in the row, will contain more stalks per acre.

When the corn is planted wide apart in the row and in wide-apart rows—matters not if the best one-eared varieties are used—the land will not “turn out” the maximum yield which it is capable of producing, for the reason that there are not enough stalks per acre.

In 1905 Cocke's Prolific and Weekley's Improved, at both the Edgecombe and Iredell farms, produced their largest yields in these tests at the distancing centering about 30 to 36 inches, while Holt's Strawberry did best at the greatest distancing. At the most favorable distancing (40 inches) Holt's Strawberry at the Edgecombe and Iredell farms yielded less by 12.6 and 4.2 bushels of shelled corn per acre, respectively, than Cocke's Prolific at the distancing best suited to it, which were 30 and 36 inches, respectively. Weekley's Improved, with its best distancing at Edgecombe, yielded 13 bushels more than Holt's Strawberry at 40-inch distancing; while at Iredell Weekley's Improved, with the stalks 36 inches in the row, produced 4.2 bushels more per acre than Holt's Strawberry at its optimum distancing (40 inches) in the row.

In 1906, being a year in which excessive amounts of rain fell during the growing period, all three varieties produced largest yields at a distancing of 20 inches in the row; while the next best yields for all were at 30 inches in the row. This year seemed to be especially favorable to the production of maximum yields of all the large one-eared varieties, and at the Iredell farm Holt's Strawberry out-yielded Weekley's Improved at both 20 and 30 inches between the hills in four-foot rows.

DISTANCE TESTS OF CORN.

The results of the distance tests of corn are brought together in Tables VII and VIII, which follow:

TABLE VII—RESULTS OF DISTANCE TESTS OF CORN.

IREDELL FARM.

Rank According to Yield of Shelled Corn per Acre.	Distance Between Stalks.	Distance Between Stalks in Row.	No. Stalks per Plat.		Number Ears per Plat.	Average Height of Stalks in Inches at Maturity.	Yield per Plat in Pounds.				Total Bushels Shelled Corn per Acre, Pounds Shelled Corn per Stalk.	Stover per Acre—Pounds.
			For Perfect Stand.	By Actual Count.			Large Ears.	Nubbins.	Total Corn on Cob.	Stover.		
6	Three and one-half feet.	Four feet-----	132	---	114.0	67.0	10.0	77.0	113.0	24.3	.45	2583
3	Three and one-half feet.	Three feet-----	178	---	120.0	81.0	5.0	86.0	119.0	27.2	.37	2720
4	Three and one-half feet.	Two and one-half feet.	202	---	123.0	80.5	4.5	85.0	95.0	26.9	.33	2171
2	Three and one-half feet.	Two feet-----	232	---	120.0	80.5	7.5	88.0	110.0	27.8	.29	2530
6	Four feet-----	Four feet-----	124	---	126.0	83.5	4.5	88.0	112.0	24.3	.55	2240
5	Four feet-----	Three feet-----	172	---	117.0	81.5	12.0	93.5	116.5	25.9	.42	2330
1	Four feet-----	Two and one-half feet.	190	---	120.0	96.0	8.0	104.0	141.0	28.8	.42	2820
8	Four feet-----	Two feet-----	209	---	123.0	68.0	6.0	74.0	96.0	20.5	.27	1920
9	Five feet-----	Four feet-----	138	---	120.0	79.0	4.0	83.0	77.0	18.4	.47	1232
10	Five feet-----	Three feet-----	174	---	114.0	75.0	4.0	79.0	111.0	17.5	.35	1776
7	Five feet-----	Two feet-----	213	---	120.0	102.0	5.5	107.5	167.5	23.8	.39	2680
1	Five feet-----	One and one-half feet.	255	---	126.0	125.0	13.0	138.0	222.0	28.8	.42	3552

TABLE VII—RESULTS OF DISTANCE TESTS OF CORN FOR 1905-'06—CON.
EXPERIMENT STATION FARM, 1905.

Rank According to Yield of Shelled Corn per Acre.	Distance Between Rows.	Distance Between Stalks in Row.	No. Stalks per Plat.		Number Ears per Plat.	Average Height of Stalks in Inches at Maturity.	Yield per Plat in Pounds.				Total Bushels Shelled Corn per Acre.	Pounds Shelled Corn per Stalk.
			For Perfect Stand.	By Actual Count.			Large Ears.	Nubbins.	Total Corn on Cob.	Stover.		
7	39.6 inches-----	30 inches-----	265	257	234	89.0	53.00	18.00	71.00	85.00	20.9	.23
5	39.6 inches-----	36 inches-----	220	223	243	90.0	56.00	17.00	73.00	87.00	21.5	.27
2	39.6 inches-----	48 inches-----	165	166	278	97.0	76.00	15.75	91.75	76.25	27.0	.46
1	39.6 inches-----	60 inches-----	132	134	245	100.0	79.75	13.75	93.50	67.50	27.5	.58
8	49.5 inches-----	24 inches-----	264	265	261	93.0	42.38	21.75	64.13	86.88	18.9	.20
6	49.5 inches-----	30 inches-----	212	211	229	96.0	52.25	18.94	71.19	73.81	21.0	.28
4	49.5 inches-----	36 inches-----	176	174	251	104.0	73.63	12.50	86.13	78.88	25.4	.41
3	49.5 inches-----	48 inches-----	132	136	243	99.0	75.00	16.25	91.25	67.25	26.9	.55

EXPERIMENT STATION FARM, 1906.

7	39.6 inches-----	30 inches-----	265	259	----	89.2	57.00	13.50	70.50	80.50	20.2	1610
4	39.6 inches-----	36 inches-----	220	217	----	81.3	69.25	9.00	73.25	77.00	22.4	1540
3	39.6 inches-----	48 inches-----	165	163	----	99.0	64.50	16.50	81.00	72.00	23.2	1440
1	39.6 inches-----	60 inches-----	135	134	----	99.2	77.38	6.00	83.38	65.00	23.9	1300
6	49.5 inches-----	24 inches-----	264	255	----	87.6	59.63	15.00	74.63	77.50	21.4	1550
5	49.5 inches-----	30 inches-----	212	205	----	90.2	63.33	13.50	76.88	67.00	22.0	1340
6	49.5 inches-----	36 inches-----	176	169	----	91.7	69.00	5.75	74.75	70.50	21.4	1410
2	49.5 inches-----	48 inches-----	132	132	----	92.3	75.38	7.75	83.13	64.00	23.8	1280

TABLE VIII—COMPILED RESULTS OF DISTANCE TESTS OF CORN.

EDGECOMBE FARM.

Year.	Yield of Shelled Corn in Bushels per Acre at Different Distancing.											
	3½ feet by 2 feet.	3½ feet by 2½ feet.	3½ feet by 3 feet.	3½ feet by 3½ feet.	3½ feet by 4 feet.	4 feet by 1½ feet.	4 feet by 2 feet.	4 feet by 2½ feet.	4 feet by 3 feet.	4 feet by 3½ feet.	4 feet by 4 feet.	5 feet by 1½ feet.
1901						28.6		28.4		24.4		22.5
1902		18.8	16.1	14.6			17.6	16.1		16.2		13.0
1903	22.0		26.8	23.7			27.4	23.0		25.4		24.6
1904	36.8	35.8	37.4		37.4	35.8	33.7	35.8	40.1		30.2	32.7
1905	16.1	12.7	22.7		29.6	12.7	18.1	18.3	15.8		17.6	26.1
Averages									24.7		22.8	22.0

RED SPRINGS FARM.

1901			9.2		10.0		10.7		16.2		20.0	17.9
1902			14.8		11.9		14.4		11.4		12.2	11.3
1903			17.8		18.3		16.5		18.2		17.6	19.2
1904			23.3						21.8		23.6	20.8
Averages			16.3								18.4	17.3

IREDELL FARM.

1903	15.8	21.9		18.0	22.9	14.5	16.4	17.1		15.4		19.8
1904	42.4	39.3		40.6	36.4	35.1	39.3	35.4		41.0		46.9
1905	31.4	38.0		39.1	37.0	34.1	37.2	34.5		34.8		46.9
1906	27.8	26.9	27.2		24.3		20.5	28.8	25.9		24.3	28.8
Averages	29.4	31.6		30.5	26.1	30.4	28.2			28.9		34.4

EXPERIMENT STATION FARM.

Year.	Yield of Shelled Corn per Acre at Different Distancing.							
	39.6 inches by 30 inches.	39.6 inches by 36 inches.	39.6 inches by 48 inches.	39.6 inches by 60 inches.	49.5 inches by 24 inches.	49.5 inches by 30 inches.	49.5 inches by 36 inches.	49.5 inches by 48 inches.
1905	20.9	21.5	27.0	27.5	18.9	21.0	25.4	26.9
1906	20.2	22.4	23.2	23.9	21.4	22.0	21.4	23.8
Averages	20.6	22.0	25.1	25.7	20.2	21.5	23.4	25.4

COMMENTS OF DISTANCE TESTS.

These tests were conducted this year at the Iredell and Experiment Station farms, seed of Cocke's Prolific having been used at Edgecombe and Experiment Station and Weekley's Improved at Iredell for planting the different tests during all the years. The distancing best suited to the soil of the Edgecombe farm in its present state of fertility, as indicated by an average of five years' results, is 4 feet by 3 feet; at Iredell and Red Springs, as an average of three and four years' results, respectively, 5 feet by 2 feet; while at the Experiment Station, as an average of two years, 39.6 inches by 60 inches afforded the highest yield. It will require a number of repetitions of this test to arrive at a fair idea of the best width of rows and distance in rows for planting corn on the types of soil used in the experiments. This will no doubt vary with the different kinds of corn, soil and season.

In Table VIII is presented in concise form the results of all distance tests with corn that have been conducted at the Edgecombe and Red Springs farms during five years, at Iredell during the past four years, and at the Experiment Station during two years.

II. VARIETY AND DISTANCE TESTS OF COTTON.

Preparation and Cultivation.—All plats devoted to these tests were broke 8 to 10 inches deep during the middle of March at Edgecombe and in January at Iredell with a two-horse turning-plow, followed by a thorough disking during the middle of April. Just before laying off the rows, which was during the last of April, the ground was "gone over" with a smoothing harrow. The rows were run 5 to 7 inches deep 3 1-3 apart with an 8-inch shovel, and the fertilizer materials applied in the drill at the following rate per acre in all tests:

Four hundred pounds of a mixture of acid phosphate, manure salt and dried blood, which contained 7 per cent available phosphoric acid, 21½ per cent potash and 21½ per cent nitrogen (equal to 3.04 per cent ammonia), costing \$4.08, were used.

The cultivation was level with cultivators, being moderately deep at the beginning of the season and shallower as the root zone increased. The cultivator was never run more than twice to the row at a time, as this more than covered the middle, and an effort was made to work over the plats as quickly as possible immediately after rains to break the crust formed by the showers and leave a dust mulch to check evaporation. The cultivator was run about 1½ to 2 inches deep toward the close of the season. It was attempted to cultivate every ten days, which had to be changed, of course, to suit the season. The cotton was reduced to a stand of 15 inches at Edgecombe and 16 inches at Iredell between the hills in the rows with the variety tests.

RESULTS OF VARIETY TESTS OF COTTON.

The results of these tests are included in the following tables:

TABLE IX—RESULTS OF

EDGECOMBE

Rank According to Selling Price of Total Products (Lint and Seed).	Varieties Tested.	Number of Stalks per Plat.			Yield of Seed Cotton in Pounds per Plat at the Several Pickings. ¹				
		For Perfect Stand.	By Actual Count.	Average Height of Stalks in Inches at Maturity.	First Picking—September.	Second Picking—October.	Third Picking—November.	Fourth Picking.	Total Pickings.
1	Cook's Improved-----	331	287	39.0	-----	-----	-----	-----	50.45
2	Brown's No. 1-----	331	276	45.5	-----	-----	-----	-----	47.55
3	Braswell's Cluster-----	331	255	35.0	-----	-----	-----	-----	48.15
4	Webb-----	331	244	43.0	-----	-----	-----	-----	48.20
5	Broadwell's Double-jointed-----	331	265	36.0	-----	-----	-----	-----	47.20
6	Bigham's Improved-----	331	237	38.0	-----	-----	-----	-----	49.45
7	Double-header-----	331	215	40.5	-----	-----	-----	-----	48.65
8	Edgeworth-----	331	227	47.0	-----	-----	-----	-----	47.50
9	Drake's Defiance-----	331	278	37.0	-----	-----	-----	-----	45.40
10	Moss' Improved-----	331	264	43.0	-----	-----	-----	-----	39.40
11	Dozier's Improved-----	331	227	49.0	-----	-----	-----	-----	45.30
12	Wilson's Matchless-----	331	269	42.0	-----	-----	-----	-----	47.15
13	Culpepper's Improved-----	331	196	48.5	-----	-----	-----	-----	45.60
14	Texas Big Boll-----	331	233	44.5	-----	-----	-----	-----	41.35
15	Black Texas Wood-----	331	286	38.0	-----	-----	-----	-----	37.10
16	King's Improved-----	331	175	44.5	-----	-----	-----	-----	37.25
17	Hawkins' Extra Prolific-----	331	251	43.5	-----	-----	-----	-----	38.20
18	Simpkins' Prolific-----	331	186	49.0	-----	-----	-----	-----	36.15
19	Butler's Early Prolific-----	331	277	41.0	-----	-----	-----	-----	39.10
20	Russell's Big Boll-----	331	201	46.0	-----	-----	-----	-----	39.70
21	Shine's Extra Early Prolific-----	331	183	47.0	-----	-----	-----	-----	37.30
22	Improved Russell's Big Boll-----	331	195	45.0	-----	-----	-----	-----	37.35
23	Mortgage Lifter-----	331	212	37.0	-----	-----	-----	-----	36.50
24	Little's Improved-----	331	144	44.5	-----	-----	-----	-----	33.25
25	Red Rust Proof-----	331	248	52.0	-----	-----	-----	-----	30.25
26	Brown Texas Wood-----	331	252	37.5	-----	-----	-----	-----	31.40

¹ Only one picking in variety tests was made this year at both the Edgcombe and Iredell farms.

VARIETY TESTS OF COTTON.

FARM.

Total Pounds Seed Cotton per Acre.	Number of Bolls Required to Yield One Pound of Seed Cotton.	Number of Seed in One Pound of Seed Cotton.	Pounds of Lint in 100 Pounds of Seed Cotton.	Pounds of Seed in 100 Pounds of Seed Cotton.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 10 Cents per Pound.	Value of Seed per Acre at \$1.00 per 100 Pounds or 30 Cents per Bushel.	Total Value of Lint and Seed per Acre.	Source of Seed.
1329.36	69	2645	39.09	60.91	519.6	809.8	\$51.96	\$ 8.10	\$60.06	Georgia.
1252.94	64	2481	37.65	62.35	471.7	781.2	47.17	7.81	54.98	Georgia.
1268.75	89	3280	34.38	65.62	436.2	832.6	43.62	8.33	51.95	North Carolina.
1270.07	85	3071	34.19	65.81	434.2	835.9	43.42	8.36	51.78	North Carolina.
1243.72	84	2336	34.74	65.26	432.1	811.6	43.21	8.12	51.33	Georgia.
1303.01	70	2525	31.52	68.48	410.7	892.3	41.07	8.92	49.99	North Carolina.
1281.93	60	2284	31.62	68.38	405.3	876.6	40.53	8.77	49.30	Georgia.
1251.63	67	2512	32.10	67.90	401.8	849.8	40.18	8.50	48.68	Georgia.
1196.29	73	2781	33.19	66.81	397.0	799.3	39.70	7.99	47.69	Georgia.
1038.19	73	3064	39.04	60.96	405.3	632.9	40.53	6.23	46.86	South Carolina.
1193.66	77	2742	32.28	67.72	385.3	808.4	38.53	8.08	46.61	North Carolina.
1242.40	89	3232	30.45	69.55	378.3	864.1	37.83	8.64	46.47	North Carolina.
1201.56	63	2439	31.08	68.92	373.4	828.1	37.34	8.23	45.62	Edgecombe Farm.
1089.57	73	2730	33.44	66.56	364.4	725.2	36.44	7.25	43.69	North Carolina.
977.59	92	3398	36.83	63.17	360.0	617.6	36.00	6.18	42.18	North Carolina.
981.54	81	2684	35.08	64.92	344.3	637.2	34.43	6.37	40.80	Edgecombe Farm.
1006.57	84	3054	33.62	66.38	338.4	668.2	33.84	6.68	40.52	Georgia.
952.55	87	3131	35.99	64.01	342.8	609.8	34.28	6.10	40.38	North Carolina.
1030.29	89	3598	32.18	67.82	331.5	698.8	33.15	6.99	40.14	North Carolina.
1046.10	58	2324	31.23	68.77	326.7	719.4	32.67	7.19	39.86	Edgecombe Farm.
982.86	78	3231	32.68	67.32	321.2	661.7	32.12	6.62	38.74	North Carolina.
984.17	75	2624	32.42	67.58	319.1	665.1	31.91	6.65	38.56	Dist. of Columbia.
961.78	66	2594	32.60	67.40	313.5	648.3	31.35	6.48	37.83	Georgia.
876.14	81	2609	36.23	63.77	317.4	558.7	31.74	5.59	37.33	Georgia.
797.08	79	3732	35.46	64.54	282.6	514.5	28.26	5.15	33.41	North Carolina.
827.39	73	2934	33.51	66.49	277.2	550.2	27.72	5.50	33.22	North Carolina.

TABLE IX—RESULTS OF VARIETY

IREDELL

Rank According to Selling Price of Total Products. (Lint and Seed).	Varieties Tested.	Number of Stalks per Plat.		Average Height of Stalks in Inches at Maturity.	Yield of Seed Cotton in Pounds per Plat at the Several Pickings.				
		For Perfect Stand.	By Actual Count.		First Picking— September.	Second Picking— October.	Third Picking— November.	Fourth Picking.	Total Pickings.
1	King's Improved-----	490	400	38	-----	-----	-----	-----	48.00
2	Broadwell's Double-jointed-----	490	432	34	-----	-----	-----	-----	45.00
3	King's Improved (Native)-----	490	411	36	-----	-----	-----	-----	43.25
4	Shine's Extra Early Prolific-----	490	450	36	-----	-----	-----	-----	36.00
5	Wilson's Matchless-----	490	375	38	-----	-----	-----	-----	34.50
6	Bigham's Improved-----	490	399	35	-----	-----	-----	-----	32.50
7	Moss' Improved-----	490	492	42	-----	-----	-----	-----	29.75
8	Dozier's Improved-----	490	310	37	-----	-----	-----	-----	34.25
9	Drake's Defiance-----	490	444	38	-----	-----	-----	-----	34.50
10	Improved Russell's Big Boll-----	490	489	39	-----	-----	-----	-----	35.00
11	Webb-----	490	336	36	-----	-----	-----	-----	34.00
12	Brown's No. 1-----	490	351	36	-----	-----	-----	-----	30.00
13	Edgeworth-----	490	363	40	-----	-----	-----	-----	33.50
14	Black Texas Wood-----	490	423	44	-----	-----	-----	-----	30.00
15	Hawkins' Extra Prolific-----	490	360	33	-----	-----	-----	-----	28.00
15	Mortgage Lifter-----	490	375	40	-----	-----	-----	-----	27.25
16	Culpepper's Improved-----	490	303	40	-----	-----	-----	-----	28.00
17	Texas Big Boll-----	490	-----	36	-----	-----	-----	-----	27.00
18	Brown Texas Wood-----	490	432	38	-----	-----	-----	-----	25.25
19	Double-header-----	490	354	34	-----	-----	-----	-----	26.50

TESTS OF COTTON—CONTINUED.

FARM.

Total Pounds Seed Cotton per Acre.	Number of Bolls Required to Yield One Pound of Seed Cotton.	Number of Seed in One Pound of Seed Cotton.	Pounds of Lint in 100 Pounds of Seed Cotton.	Pounds of Seed in 100 Pounds of Seed Cotton.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 10 Cents per Pound.	Value of Seed per Acre at \$1.00 per 100 Pounds, or 30 Cents per Bushel.	Total Value of Lint and Seed per Acre.	Source of Seed.
960.00	82	2489	36.52	63.48	350.6	609.4	\$35.06	\$ 6.09	\$41.15	Iredell Farm.
900.00	88	2939	38.35	61.65	345.2	554.8	34.52	5.55	40.07	Georgia.
865.00	86	3064	34.65	65.35	299.7	565.3	29.97	5.65	35.62	North Carolina.
720.00	86	3647	35.52	64.48	255.7	464.3	25.57	4.64	30.21	North Carolina.
690.00	77	2839	35.81	64.19	247.1	442.9	24.71	4.43	29.14	North Carolina.
650.00	76	2553	38.50	61.51	250.3	399.7	25.03	4.00	29.03	North Carolina.
595.00	83	3433	42.65	57.35	253.8	341.2	25.38	3.41	28.79	South Carolina.
685.00	79	2804	34.38	65.62	235.5	449.5	23.55	4.50	28.05	North Carolina.
690.00	74	2955	33.75	66.25	232.9	457.1	23.29	4.57	27.86	Georgia.
700.00	66	2515	32.61	67.39	228.3	471.7	22.83	4.72	27.55	District of Columbia.
680.00	85	3350	33.61	66.39	228.5	451.5	22.85	4.52	27.37	North Carolina.
600.00	67	2580	33.73	61.27	232.4	367.6	23.24	3.68	26.92	Georgia.
670.00	74	2690	34.88	65.12	233.7	336.3	23.37	3.36	26.73	Georgia.
600.00	86	3591	36.28	63.72	217.7	382.3	21.77	3.82	25.59	North Carolina.
560.00	82	2781	36.73	63.27	205.7	354.3	20.57	3.54	24.11	Georgia.
545.00	64	2147	38.03	61.97	207.3	337.7	20.73	3.38	24.11	Georgia.
560.00	67	2473	35.37	64.63	198.1	361.9	19.81	3.62	23.43	Edgecombe Farm.
540.00	74	2743	36.65	63.35	197.9	342.1	19.79	3.42	23.21	North Carolina.
505.00	72	2825	35.51	64.49	179.3	325.7	17.93	3.26	21.19	North Carolina.
530.00	64	2394	31.60	68.40	167.5	362.5	16.75	3.63	20.38	Georgia.

TABLE X—COMPILED RESULTS OF VARIETY TESTS OF COTTON.

EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Russell's Big Boll -----	1265.0	3	1487.0	1	1675.0	1	1193.7	7	1941.3	4	2096.5	3	1046.1	20	1529.2	1
Culpepper's Improved.-----	1125.6	4	1302.0	3	1230.0	5	1028.5	9	2031.3	1	1983.3	2	1201.6	13	1414.6	2
Moss' Improved -----	1305.0	1	999.0	6	-----	-----	-----	-----	1287.9	17	1604.6	8	1038.2	10	-----	-----
Breeden's Prolific -----	1205.0	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Todd's Improved -----	1000.0	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Strickland's Improved.-----	950.0	6	1142.0	4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Lewis' Prize-----	770.0	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Hawkins' Extra Pro- lific.-----	740.0	8	1053.0	5	-----	-----	-----	-----	-----	-----	-----	-----	1006.6	17	-----	-----
Peterkin's Improved --	-----	-----	1215.0	2	1372.5	2	1291.3	4	1363.6	16	1697.8	6	-----	-----	-----	-----
Griffin's Improved ----	-----	-----	957.0	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Truitt's Improved -----	-----	-----	-----	-----	1335.0	3	1036.0	8	-----	-----	1397.6	21	-----	-----	-----	-----
Daughtridge's-----	-----	-----	-----	-----	1230.0	4	1336.3	6	-----	-----	-----	-----	-----	-----	-----	-----
Blue Ribbon-----	-----	-----	-----	-----	1170.0	6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
King's Improved -----	-----	-----	-----	-----	885.0	7	1381.4	3	1747.2	3	-----	-----	981.5	16	-----	-----
Excelsior Prolific-----	-----	-----	-----	-----	-----	-----	1621.6	2	1761.4	7	1756.9	1	-----	-----	-----	-----
Edgeworth-----	-----	-----	-----	-----	-----	-----	1691.6	1	1733.0	10	1840.6	10	1251.6	8	-----	-----
Garrard's Improved Prolific.-----	-----	-----	-----	-----	-----	-----	1332.3	5	-----	-----	-----	-----	-----	-----	-----	-----
Cook's Improved -----	-----	-----	-----	-----	-----	-----	-----	-----	1818.2	2	1747.5	5	1329.4	1	-----	-----
Hodge-----	-----	-----	-----	-----	-----	-----	-----	-----	1756.6	5	1904.5	4	-----	-----	-----	-----
Mebane's Triumph -----	-----	-----	-----	-----	-----	-----	-----	-----	1775.6	6	-----	-----	-----	-----	-----	-----
Webb-----	-----	-----	-----	-----	-----	-----	-----	-----	1780.3	8	1688.0	17	1270.1	4	-----	-----
Tool's Early Prolific---	-----	-----	-----	-----	-----	-----	-----	-----	1666.7	9	1668.3	7	-----	-----	-----	-----
Shine's Extra Early Prolific.-----	-----	-----	-----	-----	-----	-----	-----	-----	1728.2	11	1850.4	15	982.9	21	-----	-----
Texas Big Boll -----	-----	-----	-----	-----	-----	-----	-----	-----	1643.0	12	-----	-----	1089.6	14	-----	-----
Speight's Prolific-----	-----	-----	-----	-----	-----	-----	-----	-----	1524.6	13	-----	-----	-----	-----	-----	-----
Brown Texas Wood-----	-----	-----	-----	-----	-----	-----	-----	-----	1415.7	14	-----	-----	827.4	26	-----	-----
Black Texas Wood-----	-----	-----	-----	-----	-----	-----	-----	-----	1543.6	15	1747.5	9	977.6	15	-----	-----
Missionary -----	-----	-----	-----	-----	-----	-----	-----	-----	1572.0	18	-----	-----	-----	-----	-----	-----
Peterkin's Improved (Craig's).-----	-----	-----	-----	-----	-----	-----	-----	-----	1534.1	19	1496.6	13	-----	-----	-----	-----
White's Long Staple --	-----	-----	-----	-----	-----	-----	-----	-----	1548.3	20	-----	-----	-----	-----	-----	-----
Florodora-----	-----	-----	-----	-----	-----	-----	-----	-----	1306.8	21	-----	-----	-----	-----	-----	-----

TABLE X—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.
RED SPRINGS FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Russell's Big Boll -----	675.0	3	496.3	1	1070.0	3	887.9	7	557.6	5	737.4	4
Culpepper's Improved (Edgecombe). -----	734.4	1	477.0	2	1218.5	1	897.2	4	-----	-----	831.8	1
Culpepper's Improved (Red Springs). -----	-----	-----	-----	-----	-----	-----	915.9	3	635.2	2	-----	-----
Peterkin's Improved ----	660.0	2	440.0	4	982.5	2	915.9	2	441.4	10	688.0	5
Daughy's Excelsior ----	655.0	4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Allen's Long Staple ----	635.0	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Excelsior Prolific -----	635.0	6	-----	-----	895.0	5	943.9	1	548.0	3	755.5	2
Texas Burr -----	630.0	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Groveton -----	605.0	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Native -----	530.0	8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Griffin's Improved -----	-----	-----	473.1	3	-----	-----	-----	-----	-----	-----	-----	-----
Hawkins' Extra Prolific -----	-----	-----	448.3	5	-----	-----	-----	-----	-----	-----	-----	-----
Moss' Improved -----	-----	-----	417.0	6	-----	-----	-----	-----	334.5	17	-----	-----
Sea Island -----	-----	-----	255.0	7	-----	-----	-----	-----	-----	-----	-----	-----
King's Improved -----	-----	-----	-----	-----	910.0	4	813.1	6	500.5	6	741.2	3
Peterkin's Improved (Craig's). -----	-----	-----	-----	-----	-----	-----	-----	-----	347.7	19	-----	-----
Truitt's Improved -----	-----	-----	-----	-----	-----	-----	411.2	8	-----	-----	-----	-----
Edgeworth -----	-----	-----	-----	-----	-----	-----	925.2	5	491.0	9	-----	-----
Cook's Improved -----	-----	-----	-----	-----	-----	-----	-----	-----	680.4	1	-----	-----
Tool's Early Prolific -----	-----	-----	-----	-----	-----	-----	-----	-----	490.1	4	-----	-----
Webb -----	-----	-----	-----	-----	-----	-----	-----	-----	503.2	7	-----	-----
Hodge -----	-----	-----	-----	-----	-----	-----	-----	-----	494.9	8	-----	-----
Speight's Prolific -----	-----	-----	-----	-----	-----	-----	-----	-----	431.0	11	-----	-----
Shine's Extra Early Prolific. -----	-----	-----	-----	-----	-----	-----	-----	-----	452.6	12	-----	-----
Black Texas Wood -----	-----	-----	-----	-----	-----	-----	-----	-----	413.6	13	-----	-----
Brown Texas Wood -----	-----	-----	-----	-----	-----	-----	-----	-----	382.5	14	-----	-----
Missionary -----	-----	-----	-----	-----	-----	-----	-----	-----	396.4	15	-----	-----
Texas Big Boll -----	-----	-----	-----	-----	-----	-----	-----	-----	392.7	16	-----	-----
White's Long Staple ----	-----	-----	-----	-----	-----	-----	-----	-----	383.7	18	-----	-----
Florodora -----	-----	-----	-----	-----	-----	-----	-----	-----	312.1	20	-----	-----

TABLE X—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

IREDELL FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
King's Improved (Native).	---	---	---	---	---	---	750.0	1	900.0	2	985.4	1	865.0	3	875.1	1
King's Improved	---	---	---	---	---	---	655.0	2	1005.0	1	765.2	11	960.0	1	822.6	2
Russell's Big Boll	---	---	---	---	---	---	640.0	3	835.0	7	---	---	---	---	---	---
Culpepper's Improved.	---	---	---	---	---	---	630.0	5	790.0	8	974.0	4	560.0	16	738.5	3
Edgeworth	---	---	---	---	---	---	605.0	4	760.0	11	873.0	12	670.0	13	727.0	4
Excelsior Prolific	---	---	---	---	---	---	475.0	6	790.0	6	801.6	10	---	---	---	---
Garrard's Improved Prolific.	---	---	---	---	---	---	410.0	7	---	---	---	---	---	---	---	---
Truitt's Improved	---	---	---	---	---	---	360.0	9	---	---	750.6	22	---	---	---	---
Peterkin's Improved	---	---	---	---	---	---	290.0	8	495.0	21	743.4	20	---	---	---	---
Webb	---	---	---	---	---	---	---	---	920.0	3	946.0	5	680.0	11	---	---
Hodge	---	---	---	---	---	---	---	---	805.0	4	1082.0	2	---	---	---	---
Tool's Early Prolific	---	---	---	---	---	---	---	---	575.0	17	818.6	13	---	---	---	---
Cook's Improved	---	---	---	---	---	---	---	---	695.0	10	938.0	3	---	---	---	---
Missionary	---	---	---	---	---	---	---	---	745.0	9	---	---	---	---	---	---
Speight's Prolific	---	---	---	---	---	---	---	---	660.0	13	---	---	---	---	---	---
Shine's Extra Early Prolific.	---	---	---	---	---	---	---	---	825.0	5	926.6	7	720.0	4	---	---
Texas Big Boll	---	---	---	---	---	---	---	---	635.0	16	---	---	540.0	17	---	---
Black Texas Wood	---	---	---	---	---	---	---	---	525.0	20	805.8	15	600.0	14	---	---
Peterkin's Improved (Craig's).	---	---	---	---	---	---	---	---	670.0	15	784.6	21	---	---	---	---
Moss' Improved	---	---	---	---	---	---	---	---	500.0	19	706.2	18	595.0	7	---	---
White's Long Staple	---	---	---	---	---	---	---	---	525.0	24	---	---	---	---	---	---
Brown Texas Wood	---	---	---	---	---	---	---	---	615.0	12	---	---	505.0	18	---	---
Florodora	---	---	---	---	---	---	---	---	440.0	25	---	---	---	---	---	---
Jackson Limbless	---	---	---	---	---	---	---	---	465.0	23	---	---	---	---	---	---
Mebane's Triumph	---	---	---	---	---	---	---	---	460.0	22	---	---	---	---	---	---
Jones's Improved	---	---	---	---	---	---	---	---	600.0	18	---	---	---	---	---	---
Excelsior	---	---	---	---	---	---	---	---	650.0	14	---	---	---	---	---	---
Wilson's Matchless	---	---	---	---	---	---	---	---	---	---	965.6	6	690.0	5	---	---
Jackson Limbless (Wilt Resistant).	---	---	---	---	---	---	---	---	---	---	720.2	19	---	---	---	---
Jackson Limbless (No. 128-1-29-1-11).	---	---	---	---	---	---	---	---	---	---	558.4	23	---	---	---	---
Dozier's Improved	---	---	---	---	---	---	---	---	---	---	890.8	9	685.0	8	---	---

TABLE X—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

IREDELL FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Berry's Big Boll-----											909.6	17				
Layton's Improved-----											791.2	14				
Gold Standard-----											787.2	16				
Butler's Early Prolific-----											894.6	8				
Broadwell's Double-jointed-----													900.0	2		
Bigham's Improved-----													650.0	6		
Drake's Defiance-----													690.0	9		
Improved Russell's Big Boll-----													700.0	10		
Brown's No. 1-----													600.0	12		
Hawkin's Extra Prolific-----													560.0	15		
Mortgage Lifter-----													545.0	15		
Double-header-----													530.0	19		

TABLE XI—SHOWING RELATIVE EARLINESS, VALUE, YIELD, AND SIZE OF BOLLS, SEED, AND STALKS OF VARIETIES OF COTTON TESTED IN 1906.

EDGECOMBE FARM.

Varieties.	Percentage of Cotton Open at the Several Pickings.			Rank According to the Following Characters.								
	First Picking.	Second Picking.	Third Picking.	Earliness as Shown by Percentage Open at First Picking.	Value of Total Products—Lint and Seed.	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed.	Height of Stalks.
Cook's Improved -----					1	1	10	1	26	7	10	14
Brown's No. 1 -----					2	2	2	3	24	4	4	6
Braswell's Cluster -----					3	3	7	10	17	18	23	19
Webb -----					4	4	6	11	16	16	19	10
Broadwell's Double-jointed -----					5	5	9	9	18	15	15	18
Bigham's Improved -----					6	6	1	23	4	8	6	15
Double-header -----					7	7	3	22	5	2	1	13
Edgeworth -----					8	8	5	21	6	6	5	4
Drake's Defiance -----					9	9	12	15	12	9	14	17
Moss' Improved -----					10	7	21	2	25	9	18	10
Dozier's Improved -----					11	10	11	19	8	11	13	2
Wilson's Matchless -----					12	11	4	26	1	18	22	11
Culpepper's Improved -----					13	12	8	25	2	3	3	3
Texas Big Boll -----					14	13	13	14	13	9	12	8
Black Texas Wood -----					15	14	22	4	23	19	12	15
King's Improved -----					16	15	20	8	19	14	11	8
Hawkins' Extra Prolific -----					17	17	16	12	15	15	17	9
Simpkins' Prolific -----					18	16	23	6	21	17	20	2
Butler's Early Prolific -----					19	18	15	20	7	18	25	12
Russell's Big Boll -----					20	19	14	24	3	1	2	15
Shine's Extra Early Prolific -----					21	20	18	16	11	12	21	4
Improved Russell's Big Boll -----					22	21	17	18	9	10	9	7
Mortgage Lifter -----					23	23	19	17	10	5	7	17
Little's Improved -----					24	22	24	5	22	14	8	8
Red Rust Proof -----					25	24	26	7	20	13	26	1
Brown Texas Wood -----					26	25	25	13	14	9	16	16

TABLE XI—SHOWING RELATIVE EARLINESS, VALUE, YIELD, AND SIZE OF BOLLS, SEED, AND STALKS OF VARIETIES OF COTTON TESTED IN 1906—CONTINUED.

IREDELL FARM.

Varieties.	Percentage of Cotton Open at the Several Pickings. ¹			Rank According to the Following Characters.								
	First Picking—October 2.	Second Picking—November 16.	Third Picking.	Earliness as Shown by Percentage Open at First Picking.	Value of Total Products (Lint and Seed).	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed.	Height of Stalks.
King's Improved -----	46.3	53.7	----	3	1	1	1	8	13	14	4	5
Broadwell's Double-jointed -----			----		2	2	3	4	17	20	15	9
King's Improved (Native) -----	60.6	39.4	----	1	3	3	2	15	6	19	17	7
Shine's Extra Early Prolific -----	30.9	69.1	----	5	4	4	5	11	10	17	21	7
Wilson's Matchless-----	24.5	75.5	----	6	5	7	9	10	11	11	14	5
Bigham's Improved -----			----		6	6	11	3	18	10	7	8
Moss' Improved -----	6.6	93.4	----	10	7	5	10	1	20	15	19	2
Dozier's Improved-----	59.8	40.2	----	2	8	8	8	16	5	12	12	6
Drake's Defiance -----			----		9	10	6	17	4	7	16	5
Improved Russell's Big Boll-----			----		10	13	4	19	2	3	6	4
Webb-----	35.7	64.3	----	4	11	12	7	18	3	16	18	7
Brown's No. 1 -----			----		12	11	13	2	19	5	8	7
Edgeworth -----	21.3	78.7	----	8	13	9	19	4	17	9	9	3
Black Texas Wood -----	15.9	84.1	----	9	14	14	12	9	12	18	20	1
Hawkins' Extra Prolific-----			----		15	16	16	6	15	13	11	10
Mortgage Lifter-----			----		15	15	18	5	16	2	1	3
Culpepper's Improved-----	21.7	78.3	----	7	16	17	15	13	8	4	3	3
Texas Big Boll -----			----		17	18	17	7	14	8	10	7
Brown Texas Wood -----			----		18	19	20	12	9	6	13	5
Double-header-----			----		19	20	14	20	1	1	2	9

¹ The results in these columns are those obtained in 1905 crop.

TABLE XII—COMPILED RESULTS OF VARIETY TESTS OF COTTON, SHOWING RELATIVE EARLINESS, VALUE, YIELDS, AND SIZE OF BOLLS, AND STALKS.¹

EDGECOMBE FARM.

Varieties.	Number of Years Tested.	Rank According to the Following Characters.								
		Value of Total Products—Seed and Lint.	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed. ²	Earliness as Shown by Percentage of Bolls Open at First Picking. ³	Height of Stalks. ⁴
Russell's Big Boll -----	3	3	3	2	6	2	1	1	7	3
Culpepper's Improved -----	3	2	2	1	5	3	2	4	5	1
Edgeworth -----	3	4	4	3	4	4	4	3	3	2
Cook's Improved -----	3	1	1	6	1	7	3	2	4	5
Webb -----	3	5	5	4	3	5	6	6	2	4
Shine's Extra Early Prolific -----	3	7	7	5	7	1	5	5	1	2
Black Texas Wood -----	3	6	6	7	2	6	7	7	6	6

RED SPRINGS FARM.

Russell's Big Boll -----	2	5	6	2	5	1	1	1	5	6
Edgeworth -----	2	3	5	3	4	2	3	3	1	5
Culpepper's Improved -----	2	2	2	1	3	3	2	2	2	2
Peterkin's Improved -----	2	6	3	5	2	4	4	5	4	3
King's Improved -----	2	1	4	6	1	5	6	6	6	4
Excelsior Prolific -----	2	4	1	4	2	4	5	4	3	1

IREDELL FARM.

King's Improved (Native) -----	4	1	2	1	2	3	4	3	1	---
King's Improved -----	4	2	1	2	1	4	3	4	2	---
Culpepper's Improved -----	4	3	4	3	4	1	1	1	3	---
Edgeworth -----	4	4	3	4	3	2	2	2	4	---

¹ The comparisons of varieties in this table are the average of results of tests of 1903, 1904, 1905 and 1906 at Iredell; of 1904, 1905 and 1906 at Edgcombe; and of 1903 and 1904 at Red Springs.² Results in this column for the Red Springs farm were obtained from data of 1904 only.³ Results in this column for the Iredell and Edgcombe farms were obtained from data of 1904, 1905 and 1906 at former, and 1904 and 1905 at the latter.⁴ Results in this column for the Edgcombe farm are obtained from data of 1906 only.

COMMENTS ON VARIETY TESTS OF COTTON.

The varieties tested this year at the Edgecombe and Iredell farms are arranged in Table IX in the order of their selling price of "total products," when lint is selling at 10 cents per pound and seed at 30 cents per bushel. This order may not be the order of productivity of seed cotton as is shown in the tests this year at both the Edgecombe and Iredell farms. For example, at the Edgecombe farm, Wilson's Matchless, although producing more seed cotton than Edgeworth, Drake's Defiance, Moss' Improved, and Dozier's Improved, each ranked higher in value of total products. The same was true of Drake's Defiance when compared with Bigham's Improved, Moss' Improved, and Dozier's Improved in the results from the Iredell farm.

The reason for some varieties, with smaller yields of seed cotton, producing more lint and hence greater selling price per acre than some others with a larger amount of seed cotton per acre, is due to the former varieties producing a higher percentage of lint to seed.

The size of the plats used for these tests were $\frac{1}{20}$ acre at Iredell and $\frac{1}{26.35}$ at Edgecombe.

To eliminate inequalities in the land, if any, the different varieties at the separate farms were planted each in separate rows arranged consecutively, and this plan repeated a sufficient number of times to give the designated acreage. It is absolutely essential, in order to eliminate soil and weather conditions as much as possible, to continue work of this kind for some years on different types of soils before attempting to draw definite conclusions.

The yields for this year are presented in Table IX, while the average rank in value of total products of the several varieties tested during the past six years is shown in Table X. The stand of Little's Improved, King's Improved, Shine's Extra Early Prolific, Simpkins' Prolific, Improved Russell's Big Boll, and Culpepper's Improved at the Edgecombe farm was very poor, ranging from less than one-half of a stand with Little's Improved to about five-eighths of a stand with Culpepper's Improved. In fact, taking the whole variety test at this farm this year the stand would be considered very irregular and poor. It is significant that all of these varieties with poor stand are small seeded varieties except two. The unfavorable spring, no doubt, was largely the cause of this defect in stand. It should not be overlooked, however, that all the varieties were planted in the same way, on the same day, on uniform land and given the same fertilization and cultural treatment, hence the results are valuable as showing the ability of certain varieties to withstand adverse seasonal conditions and produce paying yields, which is a matter of considerable importance. At the Iredell farm the stand of the different varieties was considerably better than at the Edgecombe farm, but the yields here were all compar-

atively small, as an unusually early frost in the fall, after a very late starting in the spring, followed by a wet growing season, cut off the crop from one-third to one-half, as most of the bolls on the upper portion of the plants were killed early in their growth and did not open. Only one picking was made of the varieties this year at both the Edgecombe and Iredell farms. Of the varieties that have been tested continuously at the different farms since the inauguration of variety-testing at them, as seen by Table X, Russell's Big Boll and Culpepper's Improved, as an average of seven years' tests, have ranked as the best varieties at the Edgecombe farm; Culpepper's Improved, Excelsior Prolific, King's Improved, and Russell's Big Boll were best at Red Springs as an average of five years' tests; while King's Improved, Culpepper's Improved, and Edgeworth were highest at the Iredell farm as an average of four years' testing.

In this connection it is interesting to note that in the several tests of cotton on the different farms the difference between the one yielding the highest amount of seed cotton per acre and the one the lowest in the individual tests, results have ranged from 530 to 915 pounds of seed cotton at Edgecombe with the number of varieties ranging from seven to twenty-six during the past seven years; at Red Springs 204 to 533 pounds during five years with from five to twenty varieties; and at Iredell from 455 to 565 pounds when using from nine to twenty-five varieties in the different tests during the past four years.

These results speak in no uncertain terms as to the importance and value of good seed, which are adapted to the different soils and localities of the State.

In Table XI is given the rank of the varieties tested this year according to certain characteristics; while Table XII shows the average ranking of these years at Edgecombe, two at Red Springs and four at Iredell. Both of these tables will be found to contain much information compiled in compact form.

SOME NOTES ON VARIETIES OF COTTON TESTED IN 1906.

Russell's Big Boll is a hardy, large-bolled and vigorous-growing variety that yields well, especially on a loamy or sandy soil in the eastern part of the State, and is very popular with pickers. In value of total products (lint and seed) it stood third in 1900 and 1905, first in 1901 and 1902; seventh in 1903, fourth in 1904, and twentieth in 1906, at the Edgecombe farm; third in 1900 and 1902, first in 1901, seventh in 1903 and fifth in 1904 at Red Springs; and third in 1903 and seventh in 1904 at Iredell. In ordinary seasons this variety is not only prolific, but tolerably reliable, especially on the well-drained sandy or loamy soil of the east. This season it was greatly cut off by an early frost.

Culpepper's Improved, too, is a large-bolled variety, yielding generally a little less per boll than Russell's Big Boll. It ranked¹ fourth in 1900, third in 1901, fifth in 1902, ninth in 1903, seventeenth in 1904, second in 1905, and thirteenth in 1906 at the Edgecombe farm; first in 1900, second in 1901, first in 1902, third from Red Springs seed and fourth from Edgecombe seed in 1903, second from Red Springs seed in 1904 at the Red Springs farm; and fifth, eighth, fourth, and sixteenth in 1903, 1904, 1905, and 1906, respectively, at Iredell. This variety is earlier by about ten days and seems to be more subject to variation than Russell's Big Boll, but, notwithstanding this last defect, is considered a good, reliable variety. Being a late-maturing variety and having a short growing season this year, especially at the Iredell farm, it was cut off some by frost. It has a large-sized weed with spreading limbs well bolted, and holds cotton well.

King's Improved has a boll a little smaller than Peterkin's Improved, but does not generally yield quite as high percentage of lint. It has a tolerably small stalk with spreading limbs. This and Dozier's Improved are two of the earliest-maturing varieties thus far tested. It occupied seventh place in 1902, third in 1903 and 1904, and sixteenth in 1906 at Edgecombe; fourth in 1902, sixth in 1903 and 1904 at Red Springs; and second in 1903, first in 1904 and 1906, and eleventh in 1905 at Iredell, where the growing season is comparatively short.

*Edgeworth*² stood first in 1903, tenth in 1904 and 1905, and eighth in 1906 at Edgecombe; fifth in 1903 and ninth in 1904 at Red Springs; and fourth in 1903, eleventh in 1904, twelfth in 1905, and thirteenth in 1906 at Iredell. It has a tolerably heavy stalk, large leaves and short stems. It is, ordinarily, a rather late-maturing variety.

Moss' Improved stood first in 1900, sixth in 1901, seventeenth in 1904, eighth in 1905, and tenth in 1906 at Edgecombe; sixth in 1901 and seventeenth in 1904 at Red Springs; and nineteenth in 1904, eighteenth in 1905, and seventeenth in 1906 at Iredell. This variety possessed as high percentage of lint as any other variety tested during the past two years.

Cook's Improved ranked second in 1904, fifth in 1905, and first in 1906 at the Edgecombe farm; and tenth in 1904 and third in 1905 at Iredell. It is a medium early maturing variety.

Webb occupied eighth and seventeenth places at Edgecombe in 1904 and 1905, and fourth place in 1906, seventh at Red Springs in 1904, and third, fifth, and eleventh in 1904, 1905, and 1906, at Iredell. Has rather small bolls and seeds.

¹ All ranks of varieties of cotton are based on value of total products (lint and seed) per acre.

² This variety has been tested heretofore under the name of Edgewood.

Shine's Extra Early Prolific ranked eleventh in 1904, fifteenth in 1905, and twenty-first in 1906, at Edgecombe; twelfth at Red Springs in 1904; and fifth in 1904, seventh in 1905, and fourth in 1906, at Iredell. Our tests of two years indicate this to be a rather early-maturing variety.

Black Texas Wood ranked fifteenth in 1904 and 1906 and ninth in 1905 at Edgecombe; thirteenth at Red Springs in 1904; twentieth in 1904, fifteenth in 1905, and fourteenth in 1906, at Iredell. This is a late-maturing variety.

King's Improved (native) stood first in 1903 and 1905, second in 1904, and third in 1906, at the Iredell farm. This has thus far given the best average yield of total products per acre at this farm of all varieties tested.

Wilson's Matchless ranked in 1905 and 1906 in sixteenth and twelfth places at Edgecombe, and sixth and fifth at Iredell, respectively.

Butler's Early Prolific occupied eleventh and nineteenth places at Edgecombe in 1905 and 1906, and eighth at Iredell in 1905.

Dozier's Improved ranked twentieth in 1905 and eleventh in 1906 at Edgecombe, and ninth in 1905 and eighth in 1906 at Iredell. This is a small bodied and very early-maturing variety.

Brown's No. 1 ranked in this year's tests in second place at Edgecombe and twelfth at Iredell.

Braswell's Cluster has been tested at the Edgecombe farm the past two years and has ranked in nineteenth and third places respectively.

Broadwell's Double-jointed occupied fifth place at Edgecombe and second place at Iredell in this year's tests. This is a very promising variety.

Bigham's Improved ranked sixth at both the Edgecombe and Iredell farms this year.

Double-header, in this year's tests, stood seventh at Edgecombe and nineteenth at Iredell.

Drake's Defiance ranked ninth at both Edgecombe and Iredell in this year's tests.

Texas Big Boll stood twelfth and fourteenth in 1904 and 1906 at Edgecombe; sixteenth in 1904 at Red Springs; and sixteenth and seventeenth in 1904 and 1906 at Iredell.

Hawkins' Extra Early Prolific ranked eighth in 1900, fifth in 1901, and seventeenth in 1906, at Edgecombe; fifth in 1901 at Red Springs; and fifteenth in 1906 at Iredell.

Simpkins' Prolific stood in eighteenth place at the Edgecombe farm in this year's tests.

Improved Russell's Big Boll occupied twenty-second place at Edgecombe and tenth place at Iredell.

Mortgage Lifter ranked twenty-third at the Edgecombe and fifteenth at Iredell farms respectively in this year's tests.

Little's Improved occupied twenty-fourth place at Edgecombe. Its stand was the poorest of all varieties tested this year.

Red Rust Proof in this year's test at the Edgecombe farm stood in twenty-fifth place.

Brown Texas Wood ranked fourteenth in 1904 and twenty-sixth in 1906 at Edgecombe; fourteenth in 1904 at Red Springs; and twelfth in 1904 and eighteenth in 1906 at Iredell.

STUDY OF COMPILED RESULTS OF VARIETY TESTS OF COTTON.

Seven years ago the Department of Agriculture, by means of its test farms, began comparative tests of varieties of cotton with the purpose, primarily, of ascertaining, if possible, the varieties that are most prolific of seed cotton per acre, when grown under our conditions of soil and climate. During this time tests have been the different farms. It is felt from this accumulated data of seven or eight in 1900 to twenty-seven in 1906 in the different tests on the different farms. It is felt from this accumulated data of seven years' tests that some very reliable and valuable information has been derived, especially if taken and intelligently applied by the individual farmers of the State in their farming operations.

VARIATION IN YIELD OF VARIETIES.

In our variety tests we have had some variety or varieties to yield 700 to 900 pounds of seed cotton per acre more than other varieties in the same tests and grown under identical conditions of soil, fertilization, and cultivation. This variation in yield has been no uncommon occurrence in our experience. Take, for instance, the results at the Edgecombe farm during the past seven years. In 1900, in a test of eight varieties, the difference between the variety yielding the largest amount of seed cotton per acre and the one the smallest, was 565 pounds; in 1901 and 1902, in tests of seven varieties each, the difference was 530 and 790 pounds respectively; in 1903, 663 pounds, when nine varieties were incorporated, 724 pounds in 1904 with twenty-one varieties, 576 pounds in 1905 with twenty-three varieties, and 915 pounds in 1906 with twenty-six varieties. The average of these differences is more than the average annual yield per acre of seed cotton in North Carolina. To grow cotton cheaply per pound, more must be produced per acre than is at present done on an average. To do this, better varieties must be planted, more thorough preparation and cultivation be given to the land, and more intelligent fertilization, either directly or indirectly, must be practised. It costs no more to cultivate a prolific variety of cotton than one that has few bolls to the stalk, or has a larger number of stalks missing in the row due to imperfect germination of the seed or some other avoidable or unavoidable cause.

WHAT A VARIETY SHOULD BE.

A variety of cotton should be a group of plants having some special excellencies, such as total yield of lint per acre, resistance to disease and insect pests, etc., and the seed of which should be able to transmit to their progeny, with certainty and without diminution, the excellent qualities of the parent plants. If the designated group of plants does not have these qualities, then it is not worthy to be styled a variety. Neither should the same variety have two names.

EARLY MATURING VARIETIES.

The earliest varieties, judged from the percentage of total cotton open at first picking in the past three or four years' tests at the test farms of the Department, are Dozier's Improved, King's Improved, Hodge, Shine's Extra Early Prolific, Missionary, and Webb. The first two named are probably the earliest maturing varieties we have thus far tested. They are especially adapted for growth in regions where cotton is liable to be cut off by frost, mattering not whether the prolonged growth be due to climate or soil:

MEDIUM MATURING VARIETIES.

Culpepper's Improved, Cook's Improved, Excelsior Prolific, Peterkin's Improved, and Edgeworth are varieties that matured during the past year at a medium date. Peterkin's Improved and Edgeworth were late in maturing during the past year at the Iredell farm, but medium at the other two—Edgecombe and Red Springs.

LATE MATURING VARIETIES.

Russell's Big Boll, Black Texas Wood, Brown Texas Wood, Tool's Early Prolific, and Moss' Improved were the latest varieties tested. Some of these are good yielding varieties when grown where the season is long enough for complete development of their bolls before frost.

VARIETIES WITH HIGH PERCENTAGE OF LINT.

Of the varieties tested, Moss' Improved, King's Improved, Brown Texas Wood, Peterkin's Improved, Cook's Improved, Tool's Early Prolific, Hodge, Excelsior Prolific, Brown's No. 1, Edgeworth and Mortgage Lifter are the ones that have yielded the highest percentage of lint to seed. With these varieties in 1904 the percentage of lint to seed varied from 35.42 per cent with Excelsior Prolific at the Edgecombe farm to 43.03 per cent with Moss' Improved at Iredell. The percentage yield of lint alone of a variety is frequently an unsafe guide in selecting a variety that will produce a large amount of lint cotton per acre.

VARIETIES WITH LARGE BOLLS.

Russell's Big Boll, Culpepper's Improved, Edgeworth, Double-header, and Brown's No. 1 are the five varieties thus far tested that possess the largest-sized bolls as well as seed. As an average of four years' tests at the Edgecombe farm and three years' each at the Red Springs and Iredell farms, it has required the following number of bolls to yield a pound of seed cotton: Russell's Big Boll at Edgecombe, 54; at Red Springs, 64; and at Iredell, 72. Culpepper's Improved at Edgecombe, 61; at Red Springs, 71; and at Iredell, 74. Edgeworth at Edgecombe, 72; at Red Springs, 77; and at Iredell, 79. These are late varieties and heavy producers of both lint and seed when planted upon soils that will mature them before frost.

VARIETIES ADAPTED TO THE EASTERN AND SOUTHEASTERN SECTIONS OF THE STATE.

After a study of our results with varieties obtained at the Edgecombe and Red Springs farms during the past six or seven years, it is found that of the varieties of cotton thus far tested, Excelsior Prolific, Edgeworth, Culpepper's Improved, King's Improved, Russell's Big Boll, and Peterkin's Improved have yielded the largest amounts of seed cotton per acre on an average. In the eastern part of the State, on the stiffer clayey soils, bottom-lands, poorly drained lands and lands near the northern border of the State, it will generally be found advisable to use the best of the earlier maturing varieties, such as King's Improved, Edgeworth, and Excelsior Prolific; while on the more open sandy and loamy soils of the east and southeast, the larger-bolled and more vigorously growing varieties, such as Culpepper's Improved and Russell's Big Boll, will generally yield most satisfactory returns.

VARIETIES ADAPTED TO PIEDMONT SECTION OF THE STATE.

With reference to varieties of cotton suited to this portion of the State, we cannot assert with the same degree of certainty as we can for the eastern part of the State, as our experiments have only been conducted in Iredell for four years, and with some of the varieties for only the past season. So with reference to this portion of the State on a red-clay soil, we would recommend, tentatively, guided by our results, the use of either King's Improved, Culpepper's Improved, Edgeworth, or Excelsior Prolific as the best suited. King's Improved has, in our experiments at the Iredell farm, proved to be the earliest and decidedly the most prolific variety thus far tested there, where the growing season for cotton is comparatively short. There are other promising varieties being tested, but data for a suffi-

cient number of years is not yet in hand to justify anything like definite statements in reference to them and their adaptability to different localities.

CORRELATION OF CHARACTERS OF VARIETIES OF COTTON.

With cotton, as with corn, it is of the highest importance for farmers and imperative for all those who are studying or trying to improve varieties, to know what characters are usually antagonistic and what ones are mutually helpful in their economic development. In Table XII are compiled, in concise form, the results of three years' tests at Edgcombe, four at Iredell, and two at Red Springs. From this compilation, supplemented by observation in the field and at the gin, the following tentative inferences are made in reference to the varieties of upland cotton tested, when grown under the conditions of climate and soil as represented by these three farms:

Antagonistic Characters.—(1) Earliness in maturity is not usually conducive to large yields, although in areas where a short growing period is afforded the earlier maturing varieties often give the greater yields (but these are not large generally), as is shown by King's Improved, which, during the past four years, has proven the most prolific of seed cotton at the Iredell farm, where the growing period for cotton during an average season is comparatively short. (2) Varieties that have large seed generally yield a small percentage of lint to seed. (3) Late-maturing varieties do not generally produce seed cotton that yields a high percentage of lint, although the number of pounds of lint per acre may be large. (4) Small-bolled varieties are not generally easily picked, and hence are unpopular with pickers.

Associated Characters.—(1) Varieties that mature early tend to the production of seed cotton that contains a high percentage of lint to seed. (2) Varieties with short staple usually have a high percentage of lint and *vice versa*. (3) Varieties with large bolls generally have large seed and small percentage of lint. (4) The larger the yield of seed cotton per acre, through proper fertilization or favorable seasonal conditions, the lower the percentage of lint to seed, even of the same variety. (5) Good root and leaf development of a variety tends to increase power of resistance to drought, insect and disease ravages.

PROPER PLACE TO SELECT SEED.

With cotton, as with any other staple crop, the place to select seed for the next year's planting is in the field—selecting with reference to total yield of seed cotton, percentage of lint, date of maturity, vigor, hardiness, form and size of bolls, leaves, stalks, limbs, and resistance to disease and insect ravages. By selecting from stalks

that bear a large number of bolls per stalk, the tendency will be in the progeny to give an increased yield over the average of the patch, which is the seed obtained when one waits to secure his seed at random from the gin. Another objection to securing seed from the gin in the usual way is that it is usually deferred until late in the fall, and thereby, generally, seed from the last picking are obtained, which are not the best seed. The best seed, as a rule, are from the middle picking.

In selecting a variety one must not be guided entirely by total yield of seed cotton, for often between two varieties producing about the same quantity per acre, the one with the smaller yield should be chosen because of its production of a larger amount of lint and higher selling price of total products (lint and seed). It should be remembered that lint sells for from eight to fifteen times as much per pound as seed.

Other things being equal, preference should be given to the larger-bolled varieties, with a large number of locks per boll, as they are much easier picked and hence are most popular with pickers.

A few hours spent in the fall in selecting and gathering separately the seed cotton from stalks that have a large number of bolls well distributed over the stalks and with other desirable characters, will pay as well, or better, than any other form of farm work. The seed cotton thus gathered should be ginned separately and the seed carefully saved in some secure place for the next year's planting. Every one who has been through a cotton-field in the fall has surely noticed the great difference in the same field in the form, shape, and number of bolls on different stalks, as well as in the characteristics of the stalks themselves. Now, remembering that the law of heredity is as strong and constant in plants as in animals, will help to emphasize the great importance of selecting seed of the short staple cotton only from those stalks that bear the largest amount of lint cotton per stalk. Of course, this latter statement does not apply to long staple cottons in comparison with the short staple ones, for a long staple cotton may produce less lint per acre than a short staple one, yet this smaller number of pounds may sell for more on the market, on account of its higher selling price per pound.

BUYING COTTON SEED.

Seed of cotton, as well as all other crops, should be purchased only from the most reliable sources, for frequently seeds advertised in extravagant superlatives are inferior. It is not always the cheapest seed that are secured for the smallest outlay; nor, on the other hand, are all expensive seed of superior quality; so the only safe plan to follow is to buy from the most reliable parties. It might be said, however, that if seed are properly selected they will have to bring a

good price to compensate the seedsman or grower for his extra care and expense. The seed should possess strong vitality, for seed of low vitality produce a poor stand of stunted plants that do not produce as large yields as good seed when grown under identical conditions of soil, fertilization and cultivation. It will be remembered, however, that stunted cotton will give larger proportional yields than will corn. It is common to see cotton only a few inches high bearing one, two or more small bolls per stalk, while corn that only reaches three or four or five feet high will frequently produce not much more than a spindling stalk, small shuck and cob.

SOURCES OF VARIETIES OF COTTON TESTED.

The seed used in the variety test of cotton at the Edgecombe and Iredell farms this year were received from the following sources:

Bigham's Improved.....	J. N. Bigham, R. F. D. No. 5, Charlotte, N. C.
Black Texas Wood.....	Martin McKinnon, Red Springs, N. C.
Braswell's Cluster.....	J. R. Pitt, Rocky Mount, N. C.
Broadwell's Double-jointed.....	John B. Broadwell, Crab Apple, Ga.
Brown's No. 1.....	M. L. Brown, Decatur, Ga.
Butler's Early Prolific.....	J. M. Butler, St. Pauls, N. C.
Cook's Improved.....	J. R. Cook, Schley, Ga.
Culpepper's Improved.....	Red Springs Test Farm, Red Springs, N. C.
Double-header.....	R. H. Smith, Monticello, Ga.
Dozier's Improved.....	W. D. Dozier, Camden, N. C.
Drake's Defiance.....	Drake Bros., Philomath, Ga.
Edgeworth.....	J. C. Little, Louisville, Ga.
Hawkins' Extra Prolific.....	B. W. Hawkins, Nona, Ga.
King's Improved.....	Iredell Test Farm, Statesville, N. C.
King's Improved (native).....	J. W. Sherrill, Statesville, N. C.
Little's Improved.....	J. C. Little, Louisville, Ga.
Mortgage Lifter.....	H. G. Hastings & Co., Atlanta, Ga.
Moss' Improved.....	B. D. Moss, Norway, S. C.
Red Rust Proof.....	Ira Lennon, Whiteville, N. C.
Russell's Big Boll.....	Edgecombe Test Farm, Rocky Mount, N. C.
Russell's Big Boll, Improved.....	H. J. Webber, Washington, D. C.
Shine's Extra Early Prolific.....	J. A. Shrine, Faison, N. C.
Simpkins' Prolific.....	W. A. Simpkins, Raleigh, N. C.
Texas Big Boll.....	F. D. Wilson, Littleton, N. C.
Webb.....	Dr. C. L. Killbrew, Rocky Mount, N. C.
Wilson's Matchless.....	F. D. Wilson, Littleton, N. C.

RESULTS OF DISTANCE TESTS OF COTTON.

These results are found in Tables XIII and XIV, which follow:

TABLE XIII—RESULTS OF DISTANCE TESTS OF COTTON.

IREDELL FARM—1906.

Rank According to Value of Total Products (Lint and Seed).	Distance Between Rows.	Distance Between Stalks in Rows.	Number Stalks per Plat.		Average Height of Stalks in Inches at Maturity.	Yield Seed Cotton in Pounds per Plat at the Several Pickings. ¹				Yield Seed Cotton per Acre.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 8 Cents per Pound. ²	Value of Seed per Acre at 80 Cents per Hundred Pounds or 24 Cents per Bushel. ³	Total Value of Lint and Seed per Acre.
			For Perfect Stand.	By Actual Count.		First Picking— October 22.	Second Picking— November 9.	Third Picking— January 22.	Total Pickings.						
5	3½ feet ----	12 inches--	653	496	----	----	----	----	59.50	1190.0	434.6	755.4	\$43.46	\$ 7.55	\$51.01
1	3½ feet ----	16 inches--	490	490	----	----	----	----	89.25	1785.0	651.9	1133.1	65.19	11.33	76.52
2	3½ feet ----	20 inches--	392	450	----	----	----	----	79.25	1585.0	578.8	1006.2	57.88	10.06	67.94
3	3½ feet ----	24 inches--	327	459	----	----	----	----	64.00	1280.0	467.5	812.5	46.75	8.13	54.88
4	4 feet -----	12 inches--	653	363	----	----	----	----	70.00	1215.0	443.7	771.3	44.37	7.71	52.08
6	4 feet -----	16 inches--	490	502	----	----	----	----	54.00	937.5	342.4	595.1	34.24	5.95	40.19
7	4 feet -----	20 inches--	392	501	----	----	----	----	41.50	720.5	263.1	457.4	26.31	4.57	30.80
8	4 feet -----	24 inches--	327	441	----	----	----	----	35.25	612.0	223.5	388.5	22.35	3.89	26.24

EXPERIMENT STATION FARM—1902.

					Sept. 22.	Nov. 10.	Dec. 20.							
1	39.6 inches--	12 inches--	330	-----	13.00	14.84	.13	27.97	1118.80	396.28	722.52	31.70	5.78	37.48
2	39.6 inches--	16 inches--	248	-----	12.31	15.19	.19	27.69	1107.60	392.31	715.29	31.38	5.72	37.10
6	39.6 inches--	20 inches--	198	-----	7.53	8.84	.31	16.68	667.20	236.32	430.88	18.91	3.45	22.36
5	39.6 inches--	24 inches--	165	-----	8.06	8.63	.41	17.10	684.00	242.27	441.73	19.38	3.53	22.91
3	49.5 inches--	12 inches--	264	-----	11.44	14.84	.22	26.54	1061.60	376.02	685.58	30.08	5.48	35.56
4	49.5 inches--	16 inches--	198	-----	8.16	15.59	.16	23.91	956.40	338.76	617.64	27.10	4.94	32.04
8	49.5 inches--	20 inches--	158	-----	6.34	8.69	.28	15.31	612.40	216.91	395.49	17.35	3.16	20.51
7	49.5 inches--	24 inches--	132	-----	6.59	8.91	.38	15.88	635.20	224.99	410.21	18.00	3.28	21.28

EXPERIMENT STATION FARM—1903.

					Oct. 13. 17.19	Nov. 10. 3.50	Dec. 8. .97								
2	39.6 inches--	12 inches--	330	311 ----				21.66	866.40	306.88	559.52	30.69	4.48	35.17	
5	39.6 inches--	16 inches--	248	247 ----	16.94	3.00	.75	20.69	827.60	293.13	534.47	29.31	4.28	33.59	
8	39.6 inches--	20 inches--	198	191 ----	12.50	4.16	1.63	18.29	731.60	259.13	472.47	25.91	3.78	29.69	
1	39.6 inches--	24 inches--	165	172 ----	14.97	5.28	3.06	23.31	932.40	330.26	602.14	33.03	4.82	37.85	
6	49.5 inches--	12 inches--	264	240 ----	14.97	4.19	1.50	20.66	826.40	292.71	533.69	29.27	4.27	33.54	
3	49.5 inches--	16 inches--	198	191 ----	14.63	4.88	1.31	20.82	832.80	294.98	537.82	29.50	4.30	33.80	
7	49.5 inches--	20 inches--	158	160 ----	11.56	5.19	1.94	18.69	747.60	264.79	482.81	26.48	3.86	30.34	
4	49.5 inches--	24 inches--	132	136 ----	10.53	6.69	3.50	20.72	828.80	293.56	535.24	29.36	4.28	33.64	

¹ Only one picking was made at the Iredell farm this year.² The value of lint at Iredell in 1906 and at Experiment Station in 1903 was calculated at 10 cents per pound.³ The value of seed at Iredell in 1906 was calculated at \$1.00 per hundred or 30 cents per bushel.

TABLE XIII—RESULTS OF DISTANCE TESTS OF COTTON—CONTINUED.

EXPERIMENT STATION FARM—1904.

Rank According to Value of Total Products (Lint and Seed).	Distance Between Rows.	Distance Between Stalks in Rows.	Number Stalks per Plat.		Average Height of Stalks in Inches at Maturity.	Yield Seed Cotton in Pounds per Plat at the Several Pickings.				Yield Seed Cotton per Acre.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 8 Cents per Pound. ¹	Value of Seed per Acre at 80 Cents per Hundred Pounds or 24 Cents per Bushel. ²	Total Value of Lint and Seed per Acre.
			For Perfect Stand.	By Actual Count.		First Picking— September 30.	Second Picking— November 16.	Third Picking— January 18.	Total Pickings.						
4	39.6 inches	12 inches	660	663	----	19.38	22.75	3.59	45.72	914.40	323.88	590.52	\$25.91	\$ 4.72	\$30.63
8	39.6 inches	16 inches	496	499	----	19.56	16.56	2.59	38.71	774.20	274.22	499.98	21.94	4.00	25.94
2	39.6 inches	20 inches	396	397	----	19.38	25.56	3.59	48.53	970.60	343.79	626.81	27.50	5.01	32.51
5	39.6 inches	24 inches	330	334	----	16.28	24.19	4.25	44.72	894.40	316.80	577.60	25.34	4.62	29.96
6	49.5 inches	12 inches	528	528	----	18.56	21.28	3.72	43.56	871.20	308.58	562.62	24.69	4.50	29.19
7	49.5 inches	16 inches	396	400	----	15.13	23.19	5.03	43.35	867.00	307.09	559.91	24.57	4.48	29.05
1	49.5 inches	20 inches	316	320	----	17.34	27.56	4.44	49.34	986.80	349.52	637.28	27.96	5.10	33.06
3	49.5 inches	24 inches	264	267	----	15.94	27.00	4.50	47.44	948.80	336.06	612.74	26.88	4.90	31.78

EXPERIMENT STATION FARM—1905.

						Sept. 21.	Oct. 30.	Dec. 19.						
1	39.6 inches	12 inches	660	676	----	21.69	38.78	5.44	65.91	1318.20	466.91	851.29	46.69	6.81 53.50
2	39.6 inches	16 inches	496	466	----	22.88	36.31	3.91	63.10	1262.00	447.00	815.00	44.70	6.52 51.22
3	39.6 inches	20 inches	396	406	----	23.31	34.81	4.25	62.37	1247.40	441.83	805.57	44.18	6.44 50.62
7	39.6 inches	24 inches	330	329	----	20.63	31.81	3.50	55.94	1118.80	396.28	722.52	39.63	5.78 45.41
6	49.5 inches	12 inches	528	527	----	22.94	30.63	2.44	56.01	1120.20	396.77	723.43	39.68	5.80 45.48
5	49.5 inches	16 inches	396	336	----	24.91	31.28	2.19	58.38	1167.60	413.56	754.04	41.36	6.03 47.39
4	49.5 inches	20 inches	316	318	----	23.13	32.69	2.84	58.66	1173.20	415.55	757.65	41.56	6.06 47.62
8	49.5 inches	24 inches	264	267	----	18.72	29.00	2.22	49.94	998.80	353.77	645.03	35.38	5.16 40.54

EXPERIMENT STATION FARM—1906.

						Sept. 26.	Oct. 11.	Dec. 14.						
2	39.6 inches	12 inches	660	574	33.0	18.75	21.38	12.00	52.13	1042.60	369.29	673.31	36.93	6.73 43.66
3	39.6 inches	16 inches	495	506	36.6	16.38	18.75	12.37	47.50	950.00	336.49	613.51	33.65	6.14 39.79
1	39.6 inches	20 inches	395	413	39.1	17.38	20.50	14.37	52.25	1045.00	370.14	674.86	37.01	6.75 43.76
4	39.6 inches	24 inches	330	312	39.3	12.75	18.25	14.88	45.88	917.60	325.01	592.59	32.50	5.93 38.43
5	49.5 inches	12 inches	528	541	37.0	14.25	17.63	12.00	43.88	877.50	310.81	566.69	31.08	5.67 36.75
6	49.5 inches	16 inches	396	402	35.5	10.50	17.50	15.50	43.50	870.00	308.15	561.85	30.82	5.62 36.44
7	49.5 inches	20 inches	316	326	33.5	11.13	17.25	14.87	43.25	865.00	306.38	558.62	30.64	5.59 36.23
8	49.5 inches	24 inches	264	278	36.2	8.75	13.63	11.25	33.63	672.50	233.20	434.30	23.82	4.34 28.16

¹ Lint in 1905 and 1906 was calculated at 10 cents per pound instead of 8 cents as indicated.² Seed in 1906 were calculated at \$1.00 per hundred pounds or 30 cents per bushel.

TABLE XIV—COMPILED RESULTS OF DISTANCE TESTS OF COTTON.
EDGECOMBE FARM.

Year.	Yield Seed Cotton in Pounds per Acre at Different Distancing.								
	3½ Feet by 12 Inches. ¹	3½ Feet by 16 Inches. ¹	3½ Feet by 20 Inches. ¹	3½ Feet by 24 Inches. ¹	4 Feet by 12 Inches.	4 Feet by 15 Inches.	4 Feet by 16 Inches.	4 Feet by 20 Inches.	4 Feet by 24 Inches.
1901 -----	1286.0	1384.0	1410.0	1063.0	964.0	-----	-----	893.0	-----
1903 -----	1507.1	1507.1	1342.9	1342.9	1506.3	-----	1331.1	1306.3	1312.5
1904 -----	1541.2	1751.9	1632.4	1746.0	1723.3	-----	1828.9	1646.6	1861.1
1905 -----	1593.8	1457.7	1214.2	1683.4	1896.7	-----	2019.1	1577.1	1493.4
Averages -----	1482.0	1525.1	1399.9	1458.8	1522.6	-----	-----	1355.8	-----

RED SPRINGS FARM.

1901 -----	284.0	288.0	359.0	447.8	566.9	-----	634.7	-----
1902 -----	1258.6	1310.3	1340.5	1428.9	1229.3	-----	1153.2	1051.4 1165.8
1903 -----	831.8	897.2	906.5	757.0	883.1	-----	997.6	842.2 727.7
1904 -----	857.5	750.0	675.0	860.0	767.5	-----	815.0	727.5 622.5
Averages -----	808.0	811.4	820.3	873.4	861.7	-----	900.1	-----

IREDELL FARM.

1903 -----	743.2	743.2	630.6	750.8	612.5	700.0	675.0	862.5	791.7
1904 -----	845.0	795.0	810.0	835.0	845.8	-----	812.5	779.2	762.5
1905 -----	975.0	1100.0	1035.0	1110.0	1340.0	-----	1280.0	1170.0	1325.0
1906 -----	1190.0	1785.0	1585.0	1280.0	1215.3	-----	937.5	720.5	612.0
Averages -----	938.3	1105.8	1015.2	994.0	1003.4	-----	926.3	883.1	872.8

¹The rows at the Iredell farm in 1903, 1904, 1905 and 1906, at the Red Springs farm in 1904 and at the Edgcombe farm in 1905 and 1906 were 3½ feet apart, instead of 3¼ feet as indicated.

TABLE XIV—COMPILED RESULTS OF DISTANCE TESTS OF COTTON.
CONTINUED.

EXPERIMENT STATION FARM.

Year.	Yield of Seed Cotton in Pounds per Acre at Different Distancing.							
	39.6 Inches by 12 Inches.	39.6 Inches by 16 Inches.	39.6 Inches by 20 Inches.	39.6 Inches by 24 Inches.	49.5 Inches by 12 Inches.	49.5 Inches by 16 Inches.	49.5 Inches by 20 Inches.	49.5 Inches by 24 Inches.
1902-----	1118.8	1107.6	667.2	684.0	1061.6	956.4	612.4	635.2
1903-----	866.4	827.6	731.6	932.4	826.4	832.8	747.6	828.8
1904-----	914.4	774.2	970.6	894.4	871.2	867.0	986.8	948.8
1905-----	1318.2	1262.0	1247.4	1118.8	1120.2	1167.6	1173.2	998.8
1906-----	1042.6	950.0	1045.0	917.6	877.5	870.0	865.0	672.5
Averages-----	1052.1	984.3	932.4	909.4	951.4	938.8	877.0	816.8

COMMENTS ON DISTANCE TESTS OF COTTON.

The average results of the distance tests conducted at the Edgecombe and Red Springs farms during the past four years indicate that the best distancing of cotton for the Edgecombe section is somewhere about 3½ feet by 16 inches, while at Red Springs it centers closely around 4 feet by 16 inches. As the average of four years' tests at the Iredell farm the best distancing was 3 1-3 feet by 16 inches.

At the Experiment Station farm, as an average of five years' results, a distancing of 39.6 inches between the rows with the plants 12 inches in the row has afforded the largest yield of seed cotton per acre. The next best average is from a distancing of 39.6 inches by 16 inches, but this was, on an average, 67.8 pounds of seed cotton less than 39.6 inches by 12 inches.

The general deductions above should be accepted tentatively, as here, as with other tests, it will require a number of repetitions to arrive at a fair idea of the best width of rows and distance in rows for planting cotton on the types of soils on which these tests were made.

The plats at the four farms were arranged in lateral series, with each test occupying from three to five rows.

As the results of this test are likely to vary somewhat with different varieties, Culpepper's Improved seed were used at Red Springs and Experiment Station, Russell's Big Boll at Edgecombe, and King's Improved¹ at Iredell.

¹ Culpepper's Improved was used in the test of 1903.

In Table XIV is presented a summary of four years' tests at Edgcombe and at Red Springs, and four at Iredell, and five at Experiment Station.

III. FERTILIZATION AND CULTIVATION OF CORN AND COTTON.

CORN.

Culture.—It unquestionably pays well to thoroughly break and broadcast-harrow land for corn. Using a two-horse plow and running it 8 to 10 inches deep, and afterwards harrowing with large smoothing harrow, puts the land in nice condition. It is also well to run a small-tooth harrow or weeder across corn rows about the time the plants are coming up, and even after they are several inches high, slanting the teeth of the harrow backward. Harrowing in this way saves after-cultivation, and is a quick and comparatively inexpensive way of getting over the land. The land being thoroughly broken before the corn is put in the ground, only shallow, level cultivation with some one of the considerable number of good cultivators need be given the crop during the growing season. The one-horse cultivators cover corn rows in two or three furrows, and the two-horse ones at a single trip. The cultivations should be frequent—about every ten to twelve days—and if possible, just after rains, so as to break any crust formed by showers, leaving a dust mulch to retard the loss of moisture added to the soil by previous rains. Toward the end of the growing season the cultivators should only be run one to one and a half inches deep, so as to disturb as little as possible the roots of the plants, which, by that time, are well into the middle of the rows.

Fertilizers for Corn.—The experimental work on the sandy soils of the east, reports of which have been made previously, has progressed far enough, we feel, to draw some conclusions in reference to the best amounts and proportions of nitrogen, phosphoric acid and potash for corn. As the results of the past five years' work have not yet been published, the following formulas, based on the results of the first two years' tests and tests in other States with similar soil and climatic conditions, are given as good ones for corn:

For Corn on Land in Fair Condition.

No. 1—

Acid phosphate, 14 per cent phosphoric acid.....	900 pounds
Cotton-seed meal, 6.59 ¹ per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	960 pounds
Kainit, 12.5 per cent potash.....	140 pounds
	<hr/> 2,000 pounds

¹ 6.59 per cent nitrogen equals 8 per cent ammonia.

This mixture will contain: available phosphoric acid, 7.5 per cent; potash, 1.6 per cent; nitrogen, 3.2 per cent (equal to ammonia, 3.9 per cent).

No. 2—

Acid phosphate, 14 per cent phosphoric acid.....	1,045 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	520 pounds
Nitrate of soda, 15 per cent nitrogen.....	225 pounds
Kainit, 12.5 per cent potash.....	210 pounds
	<hr/>
	2,000 pounds

In this formula one-half of the nitrogen is supplied by nitrate of soda and the other one-half by cotton-seed meal. This mixture will contain: available phosphoric acid, 8.0 per cent; potash, 1.7 per cent; nitrogen, 3.4 per cent (equal to ammonia, 4.0 per cent).

No. 3—

Acid phosphate, 14 per cent phosphoric acid.....	965 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	750 pounds
Nitrate of soda, 15 per cent nitrogen.....	110 pounds
Kainit, 12.5 per cent potash.....	175 pounds
	<hr/>
	2,000 pounds

In this formula one-fourth of the nitrogen is supplied by nitrate of soda and the other three-fourths by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.7 per cent; potash, 1.7 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 4—

Acid phosphate, 16 per cent phosphoric acid.....	835 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,010 pounds
Kainit, 12.5 per cent potash.....	155 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.9 per cent; potash, 1.7 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 5—

Acid phosphate, 14 per cent. phosphoric acid.....	860 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	850 pounds
Kainit, 12.5 per cent potash.....	290 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 8.6 per cent; potash, 1.8 per cent; nitrogen, 3.5 per cent (equal to ammonia, 4.3 per cent).

No. 6—

Acid phosphate, 16 per cent phosphoric acid.....	800 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	900 pounds
Kainit, 12.5 per cent potash.....	300 pounds
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	2,000 pounds

This mixture is more concentrated than preceding ones on account of the use of higher grade materials and will contain: available phosphoric acid, 9.1 per cent; potash, 1.9 per cent; nitrogen, 3.7 per cent (equal to ammonia, 4.5 per cent).

No. 7—

Acid phosphate, 14 per cent phosphoric acid.....	960 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	960 pounds
Muriate of potash, 50 per cent potash.....	80 pounds
	<hr/>
	2,000 pounds

This mixture, too, is more concentrated than the preceding ones on account of the use of a high-grade potassic material, muriate of potash, and will contain: available phosphoric acid, 9.6 per cent; potash, 2.0 per cent; nitrogen, 4.0 per cent (equal to ammonia, 4.8 per cent).

No. 8—

Acid phosphate, 14 per cent phosphoric acid.....	950 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,015 pounds
Muriate of potash, 50 per cent potash.....	35 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.9 per cent; potash, 1.6 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 9—

Acid phosphate, 16 per cent phosphoric acid.....	900 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,060 pounds
Muriate of potash, 50 per cent potash.....	40 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 8.5 per cent; potash, 1.8 per cent; nitrogen, 3.5 per cent (equal to ammonia, 4.3 per cent).

No. 10—

Acid phosphate, 14 per cent phosphoric acid.....	1,365 pounds
Dried blood, 13 per cent nitrogen.....	555 pounds
Muriate of potash, 50 per cent potash.....	80 pounds
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	2,000 pounds

This mixture is a concentrated one on account of high-grade nitrogenous and potassic materials being used, and will contain:

available phosphoric acid, 9.6 per cent; potash, 2.0 per cent; nitrogen, 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 11—

Acid phosphate, 16 per cent phosphoric acid.....	1,310 pounds
Dried blood, 13 per cent nitrogen.....	600 pounds
Muriate of potash, 50 per cent potash.....	90 pounds
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	2,000 pounds

This mixture is quite concentrated on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 10.5 per cent; potash, 2.3 per cent; nitrogen, 3.9 per cent (equal to ammonia, 4.7 per cent).

No. 12—

Bone meal, 22.5 per cent phosphoric acid and 3.7 per cent nitrogen	950 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	975 pounds
Muriate of potash, 50 per cent potash.....	75 pounds
	<hr/>
	2,000 pounds

This mixture is a concentrated one on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 11.9 per cent; potash, 2.6 per cent; nitrogen, 5.0 per cent (equal to ammonia, 6.0 per cent).

No. 13—

Acid phosphate, 14 per cent phosphoric acid.....	585 pounds
Cotton seed, 3.1 per cent nitrogen, 1.3 per cent phosphoric acid and 1.2 per cent potash.....	1,375 pounds
Kainit, 12.5 per cent potash.....	40 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 5.0 per cent; potash, 1.1 per cent; nitrogen, 2.1 per cent (equal to ammonia, 2.6 per cent).

Cotton Seed.—Cotton seed may replace the meal in preceding formulas containing meal by allowing 2 pounds of seed for one of meal.

Nitrate of Soda.—This material is quick-acting because of its easy solubility in water. For this reason, when used in a considerable quantity in fertilizers at time of planting, especially on light sandy land, there is considerable danger of its being leached beyond the reach of the roots of the plants before they can use it. On clay lands and loams having good subsoils, to them this danger does not exist, certainly not to the extent that it does on light soils. A small amount of nitrate of soda in the mixture will give the crop a quick start and make its cultivation easier and more economical. Formula No. 3 has been arranged with this idea in view, and in No. 2 one-half the nitrogen comes from nitrate of soda. On light lands it would likely be better to omit the nitrate from the mixture and apply it as a top

dressing between the tenth and last of June on early corn. Nitrate of soda may take the place of a portion of the other nitrogen-furnishing materials in any of the formulas, one pound of nitrate being equal in its content of nitrogen to 2.2 pounds of cotton-seed meal, 2 pounds of fish scrap, 1.2 pounds of dried blood. Nitrate of soda is frequently used as a top dressing for corn and is a very valuable material for use in this way. A good application is 50 to 75 pounds per acre, distributed along the side of the row or dropped beside the plants and three or four inches from them, or else where there is a ridge in the center it may be distributed on this, and when it is thrown out the nitrate will be thrown to the two sides of the row.

Application of Fertilizers to Corn.—On clay lands and loams having good subsoil the fertilizer should be applied in the drill, at or just before planting, at the rate of 200 to 400 pounds per acre. On light sandy lands, it is best to use 50 to 100 pounds in the drill at time of planting, to give the crop a good start, and the balance of the fertilizer as a side-dressing when the corn has begun to grow well.

Fertilizers for Corn Following Peas and Other Legumes.

The best and most profitable yields of corn in our experimental work were where the corn followed velvet beans, bur clover, cow-peas, crimson clover and other leguminous crops. These crops, with acid phosphate and kainit, or some other potash salt, are the best previous treatment and fertilization for corn. Where light crops of peas have been grown in corn, or cut from the land and the stubble left, it would be safest to add some nitrogenous material in the fertilizer mixture. In cases of this kind it is suggested that the nitrogen-furnishing material in any of the preceding formulas be reduced one-half. Where corn is to follow good crops of velvet beans, peas, bur and crimson clover or soja beans, especially where the entire crops have been left on the soil, no further application of nitrogen need be made, but it is advised that 200 to 300 pounds per acre of the following mixture, in the drill, be used just before planting:

Acid phosphate	200 pounds
Kainit	100 pounds

COTTON.

Culture.—The remarks regarding the preparation and cultivation of corn also apply with equal force to cotton, unless it be the part regarding breaking the land well before planting. Some doubt the necessity of this for cotton. Cotton is generally grown on ridges. This is necessary on wet soils, but on all fairly well-drained upland and sandy soils we are convinced that level and frequent shallow cultivation, as was indicated for corn, is the best and most economical

method to follow in growing cotton. Ridge culture may give better results in very wet years, but, taking the seasons as they come, the advantage will lie, we think, with flat culture.

Fertilizers for Cotton.—The preliminary remarks regarding fertilizers for corn also apply to cotton, the following formulas being offered tentatively and as the result of our best judgment, after studying the best obtainable data on the subject:

For Cotton on Land in Fair Condition.

No. 1—

Acid phosphate, 14 per cent phosphoric acid.....	895 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	790 pounds
Kainit, 12.5 per cent potash.....	315 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 2.6 per cent; nitrogen, 2.6 per cent (equal to ammonia, 3.2 per cent).

No. 2—

Acid phosphate, 14 per cent phosphoric acid.....	1,015 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	415 pounds
Nitrate of soda, 15 per cent nitrogen.....	180 pounds
Kainit, 12.5 per cent potash.....	390 pounds
	<hr/>
	2,000 pounds

In this formula one-half of the nitrogen is supplied by nitrate of soda and the other one-half by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.6 per cent; potash, 2.7 per cent; nitrogen, 2.7 per cent (equal to ammonia, 3.3 per cent).

No. 3—

Acid phosphate, 14 per cent phosphoric acid.....	955 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	605 pounds
Nitrate of soda, 15 per cent nitrogen.....	90 pounds
Kainit, 12.5 per cent potash.....	350 pounds
	<hr/>
	2,000 pounds

In this formula one-fourth of the nitrogen is supplied by nitrate of soda and the other three-fourths by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.4 per cent; potash, 2.6 per cent; nitrogen, 2.6 per cent (equal to ammonia, 3.1 per cent).

No. 4—

Acid phosphate, 16 per cent phosphoric acid.....	830 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	830 pounds
Kainit, 12.5 per cent potash.....	340 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.7 per cent; potash, 2.7 per cent; nitrogen, 2.7 per cent (equal to ammonia, 3.3 per cent).

No. 5—

Acid phosphate, 14 per cent phosphoric acid.....	850 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	690 pounds
Kainit, 12.5 per cent potash.....	460 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 8.0 per cent; potash, 2.9 per cent; nitrogen, 2.9 per cent (equal to ammonia, 3.5 per cent).

No. 6—

Acid phosphate, 16 per cent phosphoric acid.....	790 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	730 pounds
Kainit, 12.5 per cent potash.....	480 pounds
	<hr/>
	2,000 pounds

This mixture is more concentrated than the foregoing ones on account of the higher-grade materials used, and will contain: available phosphoric acid, 8.5 per cent; potash, 3.0 per cent; nitrogen, 3.0 per cent (equal to ammonia, 3.6 per cent).

No. 7—

Acid phosphate, 14 per cent phosphoric acid.....	1,020 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	890 pounds
Muriate of potash, 50 per cent potash.....	90 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 8.3 per cent; potash, 2.9 per cent; nitrogen, 2.9 per cent (equal to ammonia, 3.5 per cent).

No. 8—

Acid phosphate, 16 per cent phosphoric acid.....	965 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	940 pounds
Muriate of potash, 50 per cent potash.....	95 pounds
	<hr/>
	2,000 pounds

This mixture is a concentrated one on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 8.9 per cent; potash, 3.1 per cent; nitrogen, 3.1 per cent (equal to ammonia, 3.8 per cent).

No. 9—

Acid phosphate, 14 per cent phosphoric acid.....	1,045 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	820 pounds
Muriate of potash, 50 per cent potash.....	135 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 9.8 per cent; potash, 3.4 per cent; nitrogen, 3.4 per cent (equal to ammonia, 4.1 per cent).

No. 10—

Acid phosphate, 16 per cent phosphoric acid.....	975 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid	880 pounds
Muriate of potash, 50 per cent potash.....	145 pounds
	<hr/> 2,000 pounds

This mixture is considerably more concentrated than the others on account of the high-grade materials used, and will contain: available phosphoric acid, 10.4 per cent; potash, 3.6 per cent; nitrogen; 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 11—

Acid phosphate, 14 per cent phosphoric acid.....	1,355 pounds
Dried blood, 13 per cent nitrogen.....	510 pounds
Muriate of potash, 50 per cent potash.....	135 pounds
	<hr/> 2,000 pounds

This mixture will contain: available phosphoric acid, 9.5 per cent; potash, 3.4 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 12—

Acid phosphate, 16 per cent phosphoric acid.....	1,295 pounds
Dried blood, 13 per cent nitrogen.....	560 pounds
Muriate of potash, 50 per cent potash.....	145 pounds
	<hr/> 2,000 pounds

This mixture will contain: available phosphoric acid, 10.4 per cent; potash, 3.6 per cent; nitrogen, 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 13—

Acid phosphate, 14 per cent phosphoric acid.....	630 pounds
Cotton seed, 3.1 per cent nitrogen, 1.3 per cent phosphoric acid and 1.2 per cent potash.....	1,190 pounds
Kainit, 12.5 per cent potash.....	180 pounds
	<hr/> 2,000 pounds

This mixture will contain: available phosphoric acid, 5.2 per cent; potash, 1.8 per cent; nitrogen, 1.8 per cent (equal to ammonia, 2.2 per cent).

Cotton Seed and Nitrate of Soda.—The remarks under corn regarding these two fertilizing materials apply also to cotton, as do the suggestions concerning the change in the quantity of nitrogen-supplying materials in the formulas, should cotton follow peas or any other leguminous crop. In Formula No. 3 one-fourth of the nitrogen is supplied by nitrate of soda, with the view of giving the crop a quick start, and in No. 2 one-half of the nitrogen comes from this source. On light lands it will be good practice to omit this nitrate from the

mixture and apply it as a side-dressing about the middle of June. Good results come from the use of it in this way on heavy types of land. Where land does not produce a good stalk of cotton and fertilizers are used which contain only a moderate amount of nitrogen or ammonia, good results are obtained from a side-dressing of 50 to 100 pounds of nitrate of soda per acre. The nitrate should be distributed along one side of the row, or where there is a ridge in the middle it may be put on this, and when the ridge is thrown out the nitrate will be thrown on two sides of the row.

Application of Fertilizer to Cotton.—The fertilizer should be applied in the drill at or just before planting. The quantity used for cotton varies from 200 to 1,000 pounds per acre; 400 to 600 pounds are the more common quantities used of the grade of Formula No. 1. Some of the mixtures in this Bulletin are much more concentrated than No. 1, and when they are used the quantity may be reduced proportionately.

IV. COMPOSTS AND COMPOSTING.

Compost for General Use.—Frequent requests are made for compost formulas, and the following one, with barn-yard manure, rich dirt, or woods-mould, or all, and acid phosphate and kainit, is well suited for general use:

Barn-yard manure, rich dirt or woods-mould.....	1,750 pounds
Acid phosphate	200 pounds
Kainit	50 pounds
	<hr/>
	2,000 pounds

With average barn-yard manure the above compost would contain: phosphoric acid, 1.7 per cent; potash, .7 per cent; and ammonia, .6 per cent. One ton of this compost is worth between 500 and 600 pounds of the average fertilizer containing 8 per cent of available phosphoric acid, 2 per cent of potash, and 2 per cent of ammonia. It should be applied at the rate of 600 to 1,600 pounds per acre in the drill, 1,400 pounds of the compost being about equal to an application of 400 pounds of the 8-2-2 fertilizer.

The compost may be made under shelter or out of doors. In either case select a place where the soil is compact and arrange it so that the water that may run through the heap will not drain from it. Put down the materials in alternate layers: first, a layer 3 to 6 inches thick, according to the size of the compost to be made, of the manure, woods-mould or rich dirt, then sprinkle upon this layers of acid phosphate and kainit, and continue in this way to put down alternate layers of the materials till the compost is complete. If dry, the manure, mould, etc., should be moistened by sprinkling with water, and the heap should be brought to a conical or wedge shape, covered with dirt, preferably rich dirt, and thoroughly compacted to prevent undue entrance of air, which brings about heating and injurious fer-

mentation of the heap. The compost must be watched, and if it becomes hot, a hole should be made in the side and towards the top and water poured in to cool it. Heating is likely to occur if made under shelter, while if made out of doors in the winter and early spring the rains are apt to be sufficient to keep it moist, but here there is danger of loss, especially of the very soluble potash and phosphoric acid, from leaching, and the heaps made out of doors need careful watching to see that they do not get too hot just after making and between rains, and more especially to see that they are thoroughly covered with dirt and compacted, so as to make the water run mostly off the sides instead of through the heap and draining off with the most valuable part of the manure. The heap should remain 40 to 60 days, and may stay longer. Before using, it should be thoroughly cut up and mixed by means of hoes and shovels. If the manure, woods-mould and dirt are reasonably free from litter and trash, the mixture may be put through a sand-screen and be in condition to drill as other fertilizers are. This will require care in selecting the manure, mould and dirt.

Unquestionably, there is great advantage, if it is not indeed an absolute necessity, to save scrupulously all the manure and other waste material on and around the farm to assist in maintaining or increasing its productiveness. One way to do this is to use the compost in some way similar to that suggested in the foregoing. Another and perhaps somewhat cheaper way, unless the compost is made at a time when the farm labor is not profitably occupied with other work, is to apply the manure and woods-mould, etc., broadcast where there are large quantities of them, or in the drill when the amounts are limited and less than 1,500 to 2,000 pounds to the acre, and drill the acid phosphate and kainit or other materials on them. This saves the cost of mixing. Each plan has its advantages and each farmer can decide for himself which best suits his individual case and which will enable him to save to best advantage these exceedingly important and valuable fertilizer materials on and about the farm, and which go to waste, or partial waste, in far too many instances.

Compost with Cotton Seed.—Frequently cotton seed are used as a fertilizer. One difficulty in the way of their use is the killing of the germs of the seed so as to prevent them from sprouting and growing. A common custom is to pile the seed in the field early in the spring and allow them to become wet and afterwards heat. They are then put in the drill as other fertilizers, or sometimes broadcast. They are also killed by composting, and the following compost with cotton seed is a well-balanced and rich one for general farm crops:

Acid phosphate	300 pounds
Cotton seed, 13½ bushels.....	400 pounds
Kainit	75 pounds
Barn-yard manure, etc.....	1,225 pounds
	<hr/>
	2,000 pounds

This compost will contain: phosphoric acid, 2.6 per cent; potash, .9 per cent; ammonia, 1.1 per cent. One ton of it is worth between 800 and 900 pounds of the average fertilizer containing 8 per cent available phosphoric acid, 2 per cent ammonia and 2 per cent potash, and a good application for cotton would be 600 to 1,200 pounds in the drill, and for corn 400 to 800 pounds in the drill.

Compost with Cotton-seed Meal.—Cotton-seed meal may replace the seed in the preceding compost. In fact, it is much better to use some of the insoluble forms of nitrogen or ammonia in composts rather than nitrate of soda or sulphate of ammonia, which are already in easily soluble condition and ready to feed plants. Besides, there is not the same danger of loss when materials like cotton seed, cotton-seed meal, etc., are used as when nitrate of soda and sulphate of ammonia are employed. The following compost with cotton-seed meal is some richer than the one with seed given above:

Acid phosphate	325 pounds
Cotton-seed meal	200 pounds
Kainit	100 pounds
Barn-yard manure, etc.	1,375 pounds
	<hr/>
	2,000 pounds

This mixture will contain: phosphoric acid, 2.8 per cent; potash, 1.0 per cent; ammonia, 1.2 per cent. One ton of this is equal in fertilizing value to about one-half ton of a mixed fertilizer containing 8 per cent available phosphoric acid, 2 per cent ammonia and 2 per cent potash. A good application of it for cotton would be 400 to 800 pounds in the drill, and for corn 300 to 600 pounds in the drill.

Use Lime in the Compost.—Where lime is used at all in the making of compost, it should not be put in contact with either the barn-yard manure or acid phosphate, as it has an injurious action on both of these, endangering the loss of ammonia from the manure by setting it free and enabling it to pass off in the air, and changing the phosphoric acid of the acid phosphate into an insoluble form. Where sour muck or black soil is used the lime mixed with these would correct their acidity or sourness and prove beneficial.

V. FERTILIZERS FOR TOBACCO.

There are few products whose quality and quantity are more affected by the kind of soil and fertilizer used than is tobacco. For bright tobacco, the main kind grown in this State, the fine and deep sandy loam with yellow-colored sandy clay subsoil is the type of land most largely used and the one which grows the best grade of this character of tobacco. Generally, the kind of soil that is suited to the production of tobacco is better understood than the fertilizer that should be used on it. Evidence of this is seen in the great variation in the composition of fertilizers sold in the State, especially for use on the tobacco crop. In 1901 there were registered with the Depart-

ment of Agriculture one hundred and eight (108) special fertilizers for tobacco. It is interesting in this connection to note the wide variation as well as the average composition of these fertilizers. The highest amount of available phosphoric acid guaranteed in any of them was 9.25 per cent; the lowest 5 per cent, and the average 8.12 per cent. The highest amount of ammonia guaranteed was 10 per cent, the lowest 2 per cent, and the average 2.73 per cent. The highest amount of potash guaranteed was 5 per cent, the lowest 1 per cent, and the average 2.64 per cent. These wide variations in the amounts of the valuable fertilizing constituents indicate that the fertilizers themselves must have had very varying effects on the quality and quantity of the tobacco crop.

A study of the experiments in tobacco-growing and a consideration of the experiences of good tobacco growers show that the amounts of ammonia and potash in the average tobacco fertilizers, as stated above, are not as large as are needed to give the best results. It would appear that the largest amount of ammonia (10 per cent) in any of these "specials" is greater than is required for bright tobacco, while the maximum quantity of potash (5 per cent) in any of the 108 brands is less than is used by numbers of our best bright tobacco growers, especially in the eastern part of the State. A considerable number of these growers either mix their own tobacco fertilizers or else have them put up according to formulas of their suggestion. Below are given eight formulas for mixing fertilizers for tobacco. The grade of those fertilizers will be higher and they will, of course, cost more than the goods that are generally used in the State on tobacco, but we feel confident that the increased yield will more than justify the additional expense. In THE BULLETIN of the Department of Agriculture and in our correspondence with farmers we have been recommending formulas of about the composition of these for a number of years, and evidence is accumulating which shows that the character of tobacco fertilizers is undergoing quite a considerable change.

No. 1—

Acid phosphate, 14 per cent.....	750 pounds
Cotton-seed meal	900 pounds
Nitrate of soda	100 pounds
Sulphate of potash, high grade.....	250 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 6.3 per cent; potash, 6.9 per cent; nitrogen, 3.7 per cent (equal to ammonia, 4.5 per cent).

No. 2—

Acid phosphate	1,065 pounds
Dried blood, high grade.....	500 pounds
Nitrate of soda	125 pounds
Sulphate of potash, high grade.....	310 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.4 per cent; potash, 7.7 per cent; nitrogen, 4.3 per cent (equal to ammonia, 5.2 per cent).

No. 3—

Acid phosphate	875 pounds
Fish scrap	725 pounds
Nitrate of soda	100 pounds
Sulphate of potash, high grade.....	300 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 7.5 per cent; nitrogen, 3.8 per cent (equal to ammonia, 4.6 per cent).

No. 4—

Acid phosphate	1,000 pounds
Dried blood	500 pounds
Nitrate of soda	100 pounds
Sulphate of potash, high grade.....	400 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7 per cent; potash, 10 per cent; nitrogen, 4.1 per cent (equal to ammonia, 5 per cent).

No. 5—

Acid phosphate	900 pounds
Cotton-seed meal	700 pounds
Nitrate of soda	100 pounds
Sulphate of potash, high grade.....	300 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 7.7 per cent; nitrogen, 3.1 per cent (equal to ammonia, 3.8 per cent).

No. 6—

Acid phosphate	745 pounds
Cotton-seed meal	1,140 pounds
Sulphate of potash, high grade.....	115 pounds
	<hr/>
	2,000 pounds

This mixture will contain: available phosphoric acid, 6.6 per cent; potash, 3.7 per cent; nitrogen, 3.8 per cent (equal to ammonia, 4.6 per cent).

No. 7—

Acid phosphate	885 pounds
Dried blood	575 pounds
Nitrate of soda	170 pounds
Sulphate of potash, high grade.....	370 pounds
	<hr/>
	2,000 pounds

In this formula one-fourth of the nitrogen is derived from nitrate of soda and the other three-fourths from dried blood. This mixture

will contain: available phosphoric acid, 6.2 per cent; potash, 9.2 per cent; nitrogen, 5.2 per cent (equal to ammonia, 6.2 per cent).

No. 8—

Acid phosphate	874 pounds
Cotton-seed meal	782 pounds
Nitrate of soda	116 pounds
Sulphate of potash, high grade.....	228 pounds
	<hr/> 2,000 pounds

In this formula one-fourth of the nitrogen is derived from nitrate of soda, and the other three-fourths from cotton-seed meal. This mixture will contain available phosphoric acid, 4.2 per cent; potash, 6.3 per cent; nitrogen, 4.2 per cent (equal to ammonia, 5.1 per cent).

Five hundred and seventy-five pounds of No. 8 is equivalent to 600 pounds of a mixture analyzing 4 per cent available phosphoric acid, 6 per cent potash and 4 per cent ammonia.

Three hundred and fifty to one thousand pounds of these mixtures should be used to the acre.

The mixtures made from Formulas Nos. 2 and 3 are somewhat more concentrated than that from No. 1, on account of cotton-seed meal containing less ammonia than fish scrap and dried blood. The three formulas are given to enable the use of any one of the three main organic nitrogenous materials—dried blood, fish scrap and cotton-seed meal. In the coastal sections fish scrap and meal are both easily obtained; some distance inland meal is more accessible, while in the more western end of the tobacco belt it will be found convenient to use dried blood. All three are good sources of ammonia for tobacco. The other materials—nitrate of soda, sulphate of potash, and acid phosphate—are the same for all mixtures.

Occasional requests are made for formulas furnishing as much as 10 per cent of potash, and No. 4 has been arranged to meet needs of this nature. It is known that excellent tobacco, in quality and quantity, is grown by the use of fertilizers of this class, and some of our farmers greatly prefer them to others containing less potash. It takes considerable observation and experimentation to determine the best practice in matters of this kind.

Formula No. 7 in 1905, in some tobacco experiments conducted on the bright-leaf soils of Granville County, gave very promising results. Three hundred and eighty-eight pounds per acre of this mixture were used, which was equal to an application of 600 pounds of a mixture analyzing 4 per cent available phosphoric acid, 6 per cent potash and 4 per cent ammonia.

A limited quantity of stable manure is very beneficial to tobacco, and it succeeds well after peanuts. These materials add ammonia to the soil, and where heavy applications of fertilizers are to be made in connection with manure, and on peanut land, it would be well not to have so much ammonia in the fertilizers as is used in the ones em-

ployed on land not having other ammoniated materials put on them. Formula No. 5 is destined to meet cases of this kind. A good many eastern tobacco growers plant tobacco after peanuts, and some of them grow peas between the hills of tobacco, planting them with hoes and putting six to ten peas in a place the latter part of June or early in July. This improves the soil for after-crops, but tobacco grown after tobacco and peas is said not to be of good quality, though, as would be expected, the growth is very large.

Good results will come from the use of high-grade fertilizers, such as are suggested above, or similar ones, and we believe that when once tried there will be no inclination to go back to the lower-grade ones now so largely used.

THE BULLETIN

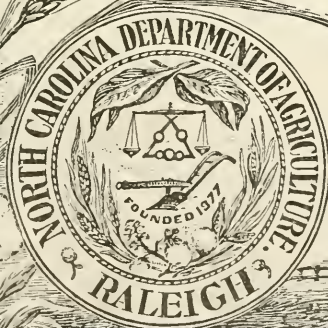
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MARCH, 1907.

STATE BOARD OF AGRICULTURE.

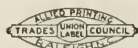
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THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 3.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, MARCH, 1907.

I.—FERTILIZER ANALYSES—FALL SEASON, 1906.

BY B. W. KILGORE, STATE CHEMIST.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the fall months of 1906. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by, or before, the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in a condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is

thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and

potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the costs of fertilizing materials are liable to change as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1906.

In Unmixed or Raw Materials.

Phosphoric acid in acid phosphate.....	4	cents per pound.
Phosphoric acid in bone meal.....	31½	cents per pound.
Ammonia	14½	cents per pound.
Potash	5	cents per pound.

In Mixed Fertilizers.

Phosphoric acid	4½	cents per pound.
Ammonia	16½	cents per pound.
Potash	5½	cents per pound.

The valuations decided on this season, for reasons already given, are:

VALUATIONS FOR 1907.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano.....	31½	cents per pound.
For ammonia	15½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid	41½ cents per pound.
For ammonia	161½ cents per pound.
For potash	51½ cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—2 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and ammonia 2 per cent, the calculation is made as follows:

Percentage or Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton 2,000 Lbs.
8 pounds available phosphoric acid at 4½ cents -----	$0.36 \times 20 =$	\$7.20
2 pounds potash at 5½ cents -----	$0.11 \times 20 =$	2.20
2 pounds ammonia at 16½ cents -----	$0.33 \times 20 =$	6.60
Total value -----	$0.80 \times 20 =$	\$16.00

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance	\$3.20	\$3.20	\$3.40	\$3.20
Apex	2.70		3.80	3.00
Ashboro	3.20	3.20	3.60	3.20
Asheville	4.00	4.00	4.00	4.00
Chapel Hill	2.95	3.20	3.90	3.20
Charlotte	2.65	3.20	2.85	3.20
Clayton	2.48	2.86	3.63	2.83
Cherryville	3.85	3.60	3.40	3.60
Clinton	1.60	3.00	3.20	3.00
Creedmoor	3.00	3.00	3.80	3.00
Cunningham	3.00	2.40	4.00	2.40
Dallas	3.00	3.60	3.40	3.60
Davidson College	3.00	3.20	2.20	3.20
Dudley	1.70	3.00	3.20	3.00
Dunn	2.00	2.80	3.20	2.80
Durham	2.80	2.83	3.20	2.83
Elkin	3.60	3.20	3.60	3.20
Elm City	2.10	2.60	3.20	2.60
Fair Bluff	1.60	3.80	2.40	3.80
Fayetteville	1.80	3.00	3.00	3.00
Forestville	2.85	3.00	3.80	3.06
Gastonia	3.12	3.25	3.12	3.25
Gibson	2.10	3.50	2.10	3.50
Goldsboro	1.80	2.80	3.20	2.80
Greensboro	2.96	3.00	3.40	3.00
Hamlet	2.00	3.00	3.60	3.00
Henderson	3.00	2.83	3.55	2.83
Hickory	3.20	3.60	3.20	3.60
High Point	3.00	3.08	3.40	3.08
Hillsboro	2.88	2.88	2.68	2.88
Kernersville	3.00	3.00	3.40	3.00
Kinston	2.10	2.80	3.50	2.80
Laurel Hill	1.90	2.40	3.80	3.40
Laurinburg	1.90	3.40	3.80	3.40
Liberty	2.72	3.60	3.80	3.60
Louisburg	2.95	3.00	3.80	3.00
Lumberton	1.60	3.60	3.70	3.60
Macon	3.05	3.00	3.85	3.00
Madison	3.00	3.00	3.40	3.00
Matthews	2.60	3.20	3.20	3.20
Maxton	1.80	3.40	2.70	3.40
Milton	3.44	2.40	4.00	2.40
Mocksville	3.36	3.20	3.40	3.20
Morven	2.55	3.60	2.50	3.60
Mount Airy	2.20	3.40	3.80	3.40
Nashville	2.30	2.90	3.40	2.90
New Bern	1.25	1.75	3.95	1.75
Norwood	3.68	3.20	3.20	2.23
Oxford	3.04	2.83	3.55	2.83
Pineville	2.77	3.25	3.00	3.20
Pittsboro	2.60	3.30	4.10	3.30
Polkton	2.40	3.00	2.20	3.00
Raleigh	2.56	2.83	3.40	2.83
Reidsville	3.00	2.96	3.40	2.36
Rockingham	2.10	3.00	3.80	3.00
Rocky Mount	2.20	2.50	3.40	2.50
Ruffin	3.28	2.80	3.40	2.20
Rural Hall	3.28	3.20	3.60	3.20
Rutherfordton	3.05	3.65	3.05	3.65
Salisbury	3.25	3.20	3.20	3.20
Sanford	2.10	3.00	3.40	3.00
Selma	2.10	2.80	3.20	2.80
Shelby	2.90	3.60	3.90	3.60
Siler City	2.60	3.60	3.80	3.60
Smithfield	2.20	2.80	8.20	2.80
Statesville	3.50	3.20	3.60	3.20
Stem	2.95	2.83	3.80	2.83
Tarboro	2.30	2.40	3.00	2.40
Waco	2.90	3.60	3.40	3.60
Wadesboro	2.30	3.00	2.50	3.00
Walnut Cove	3.00	3.00	3.40	3.00
Warrenton	3.05	3.25	4.10	3.25
Warsaw	1.50	3.00	3.20	3.00
Washington	2.65	1.75	2.25	1.50
Weldon	2.55	1.90	3.85	1.90
Wilson	2.00	2.60	3.20	2.60
Winston-Salem	3.00	3.00	3.40	3.00

5527	Patapasco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano	S	5.35	2.70	8.05	.76	1.46	2.22	2.12	16.90
5528	Powhatan Chemical Co., Richmond, Va.	Magic Special Fertilizer	R	7.20	1.82	9.02	1.38	1.06	2.44	2.01	18.38
5534	Richmond Guano Co., Richmond, Va.	Premium Brand Fertilizer	R	5.35	2.22	7.57	.72	1.18	1.90	3.03	16.41
5407	Royster, F. S., Guano Co., Norfolk, Va.	Farmers Bone Fertilizer	R	5.99	3.06	8.05	.86	.76	2.12	2.00	16.44
5505	Tuscarora Fertilizer Co., Baltimore, Md.	Standard	S	3.90	4.80	10.30	.96	1.34	1.76	2.09	17.37
5421	Union Guano Co., Winston, N. C.	Old Honest Guano	R	6.68	2.36	9.04	1.84	.94	2.28	2.34	18.23
5462	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Fertilizer	R	5.25	3.04	8.29	.72	1.28	2.00	1.67	15.89
5511	do	Atlantic Fertilizer Co.'s Eureka Ammoniated Bone	R	4.95	2.99	7.94	.74	1.42	2.16	2.45	16.96
5481	do	Davie & Whittle's Owl Brand Guano	S	5.48	3.02	8.50	.70	1.30	2.00	2.00	16.45
5436	do	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano	S	5.50	3.57	9.07	.80	1.14	1.94	2.17	16.95
5525	do	Old Dominion Guano Co.'s Farmers' Friend Fertilizer	R	5.10	2.94	8.04	.64	1.52	2.16	2.12	16.69
5481	do	Old Dominion Guano Co.'s Soluble Guano	R	5.35	3.17	8.52	.78	1.18	1.96	2.36	16.73
5512	do	Plant Food	R	5.10	2.87	7.97	.30	2.22	2.52	1.87	17.54
5511	do	Travers & Co.'s National Fertilizer	R	3.43	5.06	8.49	.98	1.18	2.16	2.01	16.93
5549	Brand claiming American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	R Y	7.03	2.12	8.00	.76	1.48	2.00	1.50	15.45
5482	Brand claiming Listers' Agricultural Chemical Works, Newark, N. J.	Listers Ammoniated Dissolved Bone Phosphate	R	6.28	1.97	8.25	.86	1.76	2.62	2.08	17.65
5544	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s N. C. Official Farmers Alliance Guano	S Y	6.55	2.09	8.64	.76	2.04	2.50	3.00	18.75
5552	Brand claiming Acme Mfg. Co., Wilmington, N. C.	Acme Fertilizer for Tobacco	R	7.48	1.17	8.65	1.14	1.80	3.00	2.50	19.85
5484	Brand claiming Bangh & Sons Co., Norfolk, Va.	Grand Rapid Guano	R	6.45	2.20	8.65	.86	2.20	3.06	3.13	20.92
5524	Royster, F. S., Guano Co., Norfolk, Va.	Marlboro High Grade Cotton Grower	R	6.78	1.64	8.42	1.16	1.38	2.54	3.01	21.19
5556	Brand claiming Navassa Guano Co., Wilmington, N. C.	Navassa Special Truck Guano	S P	7.30	1.50	8.80	1.78	1.30	4.00	4.00	24.80
5582	Brand claiming Chickamauga Fertilizer Works, Chattanooga, Tenn.	Chickamauga Blood and Bone	S	6.08	4.20	10.28	.80	1.00	3.08	4.43	22.95
5547	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Standard Guano	S Y	8.08	2.04	9.00	.88	1.40	2.00	1.80	16.93
5548	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Cocke's High-grade Animal Bone Soluble Guano	R	7.55	2.31	9.86	.82	1.34	2.25	3.00	18.83
5446	Brand claiming Bradley Fertilizer Co., Boston, Mass.	B. D. Sea Fowl Guano	R	6.73	2.80	9.53	1.10	1.40	2.16	3.21	19.53
									2.25	1.60	16.62
									2.50	1.78	18.78

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

5515	Norfolk Fertilizer Co., Norfolk, Va.	Young's Grain Grower	Siler City	S	12.05	2.31	14.36	1.85	14.96
5528	Patapasco Guano Co., Baltimore, Md.	Potash.	Granite Falls	R	7.75	2.41	10.19	2.11	11.49
5538	Richmond Guano Co., Richmond, Va.	Bone and Potash Mixture	Asheville	R	5.95	4.07	10.02	2.00	11.21
5411	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Hillsboro	R	8.40	2.18	10.62	1.75	11.48
5550	Swift's Fertilizer Works, Atlanta, Ga.	Bone and Potash	Bryson City	R	6.50	4.00	10.50	2.03	11.59
5508	Tuscarora Fertilizer Co., Wilmington, N. C.	Union Bone and Potash	Liberty	S	8.50	3.12	11.62	3.01	13.76
5413	Union Guano Co., Winston, N. C.	Allison & Addison's B. P.	Greensboro	S	7.45	3.90	11.15	1.87	12.09
5517	Va.-Car. Chemical Co., Richmond, Va.	Potash Mixture.	Wauchtown	R	2.53	7.73	10.26	1.67	11.07
5465	do	Davie & Whittle's Owl Brand	Norwood	R	5.98	4.60	10.58	4.16	14.09
5490	do	Acid Phosphate with Potash.	China Grove	R	5.03	4.85	9.88	2.39	11.52
5458	do	Old Dominion Guano Co.'s H. G. Alkaline Bone.	Reidsville	S	5.93	4.68	10.61	1.94	11.68
5448	do	Southern Chemical Co.'s Winston Bone and Potash Comp.	Charlotte	R	4.93	4.81	9.74	2.00	10.96
5558	do	Travers & Co.'s Capital Bone and Potash Compound.	Clemmons	R	3.00	7.01	10.01	2.08	11.29
5476	Brands claiming Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Morris & Scarboro's Special Bone and Potash Mixture for Wheat.	Ashboro	S	8.73	3.44	10.17	3.00	12.20
5506	Norfolk Fertilizer Co., Norfolk, Va.	Shenandoah Wheat Mixture	Bear Creek	R	8.43	1.81	10.24	3.35	12.90
5477	Union Guano Co., Winston, N. C.	Giant Phosphate and Potash	Ashboro	R	4.43	5.32	9.75	3.51	12.63
5497	Brands claiming Armour Fertilizer Works, Wilmington, N. C.	Armour's Superphosphate and Potash Fertilizer.	Taylorsville	R	8.33	1.60	9.93	3.80	13.11
5488	Baugh & Sons Co., Norfolk, Va.	Baugh's H. G. Potash Mixture	Concord	R	4.75	5.21	9.96	4.02	13.38
5460	Reidsville Fertilizer Co., Reidsville, N. C.	Bone and Potash	Reidsville	R	5.63	3.31	8.94	4.15	12.61
5507	Tuscarora Fertilizer Co., Wilmington, N. C.	Alkaline	Liberty	R	8.45	1.48	9.93	4.03	13.36
5429	Union Guano Co., Winston, N. C.	Quaker Grain Mixture	Salisbury	S	7.73	3.82	11.55	2.88	13.56
5509	do	Union 12-3 Bone and Potash	Liberty	S	8.90	2.41	11.31	3.55	14.08
5489	Va.-Car. Chemical Co., Richmond, Va.	Va. State Fertilizer Co.'s XX Potash Mixture.	China Grove	R	5.23	4.36	9.59	4.00	13.03
5551	do	V. C. Co.'s Special Potash Mixture.	Charlotte	D	7.28	3.90	11.18	3.63	14.05

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1906—CONTINUED.

Name and Address of Manufacturer.		Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.								Relative Value per Ton at Factory.		
Laboratory Number.				Mechanical Condition.	Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.			
RAW OR UNMIXED FERTILIZER MATERIALS.														
Brand claiming Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.		Dandy Caraleigh Acid Phosphate	Ashboro	R		7.33	4.40	10.00						\$ 8.00
Brands claiming Columbia Guano Co., Norfolk, Va.		Columbia Acid Phosphate.	Kernersville	R		10.08	3.44	12.00						9.60
5521	5469	Royster, F. S., Guano Co., Norfolk, Va.	Richfield	R		9.65	3.56	13.21						10.81
5430		Va.-Car. Chemical Co., Richmond, Va.	Salisbury	R		6.48	5.70	12.18						10.56
		Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate.												9.74
Brand claiming Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.		Sterling High Grade Acid Phosphate.	Statesville	R		13.78	2.01	15.79						10.40
5500														12.63
5417		Etiwan Fertilizer Co., Charleston, S. C.	Hillsboro	R		10.38	3.57	13.95						11.16
5498		Farmers Guano Co., Raleigh, N. C.	Statesville	D		12.43	3.16	15.59						12.47
5510		Navassa Guano Co., Wilmington, N. C.	Gulf	R		12.20	3.92	16.12						12.89
5541		Richmond Guano Co., Richmond, Va.	Asheville	R		5.48	6.22	11.70						9.36
5518		Royster, F. S., Guano Co., Norfolk, Va.	Siler City	R		10.10	3.40	13.50						10.80
5560		Swift's Fertilizer Works, Atlanta, Ga.	Rural Hall	R		8.88	4.94	13.82						11.05
5479		Union Guano Co., Winston, N. C.	Thomasville	R		9.75	3.58	13.33						10.66
5414		Va.-Car. Chemical Co., Richmond, Va.	Durham	S		8.30	4.97	13.27						10.61
5530		do	Davie & Whittle Owl Brand Acid Phosphate.	D		7.83	5.79	13.62						10.89
5453		do	Durham Fertilizer Co.'s High Grade Acid Phosphate.	R		9.88	3.61	13.49						11.79
5467		do	Old Dominion Guano Co.'s High Grade Bone Phosphate.	R		8.98	4.06	13.04						11.73
5519		do	Tinsley & Co.'s Dissolved S. C. Bone.	R		9.75	3.90	13.65						10.92

[illegible]

* Total Phosphoric Acid found. 21.38. valued at 3½ cents per pound.

†Total Phosphoric Acid found. 22.90, valued at 3½ cents per pound.

††Total Phosphoric Acid found-21.08, valued at 3½ cents per pound.

4 Total I n o s p h o r i c A c i d r o u n d , 21.08, v a l u e d a t 3½ c e n t s p e r p o u n d .

IN, D, N, S, D, I, I and W refer to the mechanical condition of retained wet.

II. FERTILIZER BRANDS REGISTERED FOR 1907.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Geo. L. Arps & Co., Norfolk, Va.—</i>			
Geo. L. Arps & Co.'s Big Yield Guano.....	8	2	2
14 Per Cent Acid Phosphate.....	14	..	..
High Grade Premium Guano.....	8	2	2
Kainit .....	..	..	12
Arps' Potato Guano.....	6	7	5
Arps' Standard Truck Guano.....	7	5	5
Arps' Scuppernong Guano for Truck.....	6	5	7
<i>Alabama Cotton Oil Co., Huntsville, Ala.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Atlantic Chemical Co., Norfolk, Va.—</i>			
Atlantic 7 Per Cent Truck Guano.....	7	7	7
Atlantic Potato Guano.....	7	5	5
Atlantic Special Truck Guano.....	8	4	4
Atlantic High Grade Cotton Guano.....	8	3	3
Atlantic High Grade Tobacco Guano.....	8	3	3
Atlantic Meal Compound.....	9	2.75	2
Atlantic Tobacco Grower.....	8	2.50	3
Atlantic Tobacco Compound.....	8	2.50	2
Atlantic Soluble Guano.....	8	2	2
Atlantic Special Wheat Fertilizer.....	8	2	2
Atlantic Cotton Grower.....	8	2.50	1
Atlantic Special Guano.....	8	2	1
Atlantic 8 and 2 Bone and Potash Mixture.....	8	..	2
Atlantic 8 and 4 Bone and Potash Mixture.....	8	..	4
Atlantic Bone and Potash Mixture.....	10	..	2
Atlantic Bone and Potash for Grain.....	10	..	3
Atlantic 10 and 4 Bone and Potash Mixture.....	10	..	4
Atlantic Acid Phosphate.....	12	..	..
Atlantic High Grade Dissolved Bone.....	13	..	5
Atlantic 14 Per Cent Acid Phosphate.....	14	..	..
Atlantic High Grade 16 Per Cent Acid Phosphate..	16	..	..
Oriental High Grade Guano.....	8	4	4
Perfection Peanut Grower.....	7	..	5
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
Cotton-seed Meal .....	..	7.50	..
<i>The Armour Fertilizer Works, Baltimore, Md.—</i>			
12 Per Cent Acid Phosphate.....	12	..	..
13 Per Cent Acid Phosphate.....	13	..	..
Star Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Phosphate and Potash No. 1.....	10	..	2
Phosphate and Potash No. 2.....	8	..	5
Wheat Grower	10	..	4
Phosphoric Acid and Potash.....	10	..	5
Top Dresser	5	10	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
10 Per Cent Trucker.....	5	10	3
Ammoniated Bone with Potash.....	6	3	2
Manure Substitute	6	4	4
7 Per Cent Trucker.....	6	7	5
General	8	2	2
Fruit and Root Crop Special.....	8	2	5
High Grade Potato.....	8	2	10
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Cotton Special	8	3	3
Tobacco Special	8	3	3
Truck and Berry Special.....	8	3	10
All Soluble	8	3.50	4
Special Trucker	8	4	4
Bone, Blood and Potash.....	8	5	7
Bone and Dissolved Bone with Potash.....	9	2	3
African Cotton Grower.....	9	3	3
10 Per Cent Tankage.....	..	10	..
M. H. White & Co.'s Special Corn Mixture.....	10	..	2
Bone Meal	24	3	..
Acidulated Bone Meal	18	2	..
Raw Bone Meal	22	4.50	..
German Kainit .....	..	..	12
16 Per Cent Kainit.....	..	..	16
Dried Blood .....	..	16	..
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Superphosphate and Potash.....	10	..	4
Armour Sweet Potato Special.....	8	2.50	3
Armour Slaughter House Fertilizer.....	8	2	2
Armour's Defiance	8	2.50	3

Acme Manufacturing Co., Wilmington, N. C.—

Acme Fertilizer	8	3	2.50
Acme Fertilizer for Tobacco.....	8	3	2.50
Acme Truck Grower.....	6	4	8
Acme Cotton Grower.....	9	2.75	2
Acme Standard Guano.....	8	2.50	2
Acme Soluble Bone	8	2.50	1
Acme Special Grain Fertilizer.....	8	2	2
Acme High Grade Guano.....	6	6	8
Acme High Grade Acid Phosphate.....	14	..	..
Acme Ammoniated Dissolved Bone.....	8	2	1
Acme Acid Phosphate.....	13	..	..
Acme Strawberry Top Dressing.....	8	2	4
Lattimore's Complete Fertilizer.....	8	2.50	2
Cotton-seed Meal Guano.....	8	2	2
Quick Step	8	4	4
Pee Dee Special.....	8	3	3
16 Per Cent Acid Phosphate.....	16	..	..
Gem Fertilizer	8	2	2
Acid Phosphate	12	..	..
Bone and Potash.....	11	..	2
Bone and Potash.....	8	..	4
Bone and Potash.....	8	..	3
Bone and Potash.....	8	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bone and Potash.....	10	..	4
Bone and Potash.....	10	..	3
Bone and Potash.....	10	..	2
Tip Top Crop Grower.....	8	2.50	3
Pure German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	48
Tip Top Tobacco Grower.....	8	2.50	3

Ashepoo Fertilizer Co., Charleston, S. C.—

Ashepoo Watermelon Guano.....	10	4	5
Ashepoo Fertilizer	9	2.25	1
Ashepoo Harrow Brand Raw Bone Superphosphate.	9	2	2
Ashepoo Wheat and Oats Specific.....	9	2	1
Ashepoo XXX Guano.....	8.65	2	2
Ashepoo XX Guano.....	8.50	2	2
Ashepoo Fruit Grower.....	8	4.75	2.75
Ashepoo Perfection Guano.....	8	4	6
Ashepoo High Grade Guano.....	8	4	4
Ashepoo Golden Tobacco Producer.....	8	3	3
Ashepoo X Tobacco Fertilizer.....	8	3	3
Ashepoo Bird and Fish Guano.....	8	3	3
Ashepoo Meal Mixture.....	8	3	3
Ashepoo High Grade Ammoniated Superphosphate.	8	3	2
Ashepoo Special Cotton-seed Meal Guano.....	8	3	2
Ashepoo Farmers' Special.....	8	2.50	3
Ashepoo Circle Guano.....	8	2.50	2
Ashepoo Guano.....	8	2.50	1
Ashepoo Special Fertilizer.....	8	2	2
Ashepoo Truck Guano.....	7	5	5
Ashepoo Vegetable Guano.....	5	5	5
Ashepoo High Grade Acid Phosphate Potash.....	12	..	1
Ashepoo Potash Acid Phosphate.....	11	..	1
Ashepoo Superpotash Acid Phosphate.....	10	..	4
Ashepoo Potash Compound.....	10	..	3
Ashepoo Dissolved Phosphate.....	16	..	..
Ashepoo XXXX Acid Phosphate.....	14	..	..
Ashepoo High Grade Acid Phosphate.....	13	..	..
Ashepoo XXX Acid Phosphate.....	13	..	..
Ashepoo Dissolved Bone.....	12	..	..
Ashepoo XX Acid Phosphate.....	12	..	..
Eutaw High Grade Acid Phosphate.....	13	..	..
Eutaw XX Acid Phosphate.....	12	..	..
Eutaw Superpotash Acid Phosphate.....	10	..	4
Eutaw Potash Acid Phosphate.....	11	..	1
Eutaw High Grade Acid Phosphate and Potash....	12	..	1
Eutaw X Golden Fertilizer.....	8	3	4
Eutaw Special Cotton-seed Meal Guano.....	8	3	4
Eutaw XX Guano.....	8.50	2	2
Eutaw XXX Guano.....	9	2	2
Eutaw Fertilizer	9	2.25	1
Eutaw Circle Guano.....	8	2.50	2
P. D. Fertilizer.....	8	2	1
Circle Bone	13	..	..
Brownwood Acid Phosphate.....	8	..	4
Enoree Acid Phosphate.....	10	..	2
Taylor's Circle Guano.....	9	2	4
Palmetto Potash Acid Phosphate.....	11	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Carolina High Grade Acid Phosphate.....	13	..	..
Carolina Guano	8	2	2
Carolina XXX Guano.....	8	3	3
Coomassie Acid Phosphate.....	12	..	..
Coomassie Circle Fertilizer.....	8	2	2
Muriate of Potash.....	..	..	45
Nitrate of Soda.....	..	18	..
German Kainit .....	..	..	12

A. D. Adair and McCarty Bros., Atlanta, Ga.—

David Harum Extra High Grade Guano.....	10	4	4
Adair's High Grade Blood and Bone.....	10	3	3
Adair's Soluble Pacific Guano.....	10	2	2
Adair's Ammoniated Dissolved Bone.....	8	2	2
Planter's Soluble Fertilizer C. S. M.....	8	2	2
Adair's Blood and Bone.....	9	2	1
A. and M. 13-4.....	13	..	4
High Grade Potash Compound.....	10	..	4
Adair's Wheat and Grass Grower.....	10	..	4
Adair's Special Potash Mixture.....	8	..	4
Adair's Formula	10	..	2
Adair's High Grade Dissolved Bone.....	16	..	..
Adair's Dissolved Bone.....	12	..	..
Special Wheat Compound.....	10	2	4
Special Cotton Compound.....	10	2	4

Anderson Phosphate and Oil Co., Anderson, S. C.—

Anderson Extra Best Guano.....	10	4	4
Anderson Special Fertilizer.....	8	3	3
Anderson Truck Fertilizer.....	8	4	4
Anderson XXXX Potash Bone.....	10	..	4
Anderson Cotton Fertilizer.....	8	2	2
Anderson XXX Potash Bone.....	8	..	4
Anderson XXXXX Potash Bone.....	12	..	2
Anderson Superphosphate	16	..	..
Anderson XX Potash Bone.....	10	..	2
Anderson Special Dissolved Bone.....	14	..	..
Anderson Special Potash Dissolved Bone.....	15	..	..
Anderson High Grade Dissolved Bone.....	13	..	..
Anderson Extra Guano.....	9	2	3
Anderson Kainit .....	..	..	12

American Agricultural Chemical Co., New York, N. Y.—

Holmes & Dawson Productive Cotton and Peanut Grower	9	2.75	2
Holmes & Dawson Gold Dust Guano.....	9	2	2
Holmes & Dawson Triumph Soluble.....	8	2	2
Savage Sons & Co.'s Purity Guano.....	8	2	2
Victor Truck Phosphate.....	8	4	7
Zell's 10 Per Cent Trucker.....	5	10	3
Zell's 7 Per Cent Potato and Vegetable Manure....	6	7	5
Zell's Truck Guano.....	7	5	5
Zell's Special Compound for Potatoes and Vegetables	8	3	4
Zell's Tobacco Fertilizer.....	8	3	4
Zell's Bright Tobacco Grower.....	8	3	3
Zell's Reliance High Grade Manure.....	8	3	3
Zell's Royal High Grade Fertilizer.....	9	2.50	2
Zell's Calvert Guano.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Zell's Special Compound for Tobacco.....	8	2	2
Zell's Ammoniated Bone Superphosphate.....	8	2	1
Zell's High Grade Potash Fertilizer.....	10	..	4
Zell's Electric Phosphate.....	10	..	2
Zell's Dissolved Bone Phosphate.....	14	..	..
Detrick's Virginia Trucker.....	6	7	7
Detrick's Gold Basis.....	6	7	5
Detrick's High Grade Potato Manure.....	4	7	5
Detrick's Special Trucker.....	7	5	5
Detrick's Truckers' Bone Phosphate.....	4	5	9
Detrick's Gold Eagle.....	6	3	6
Detrick's Quickstep Bone Phosphate.....	8	3	4
Detrick's Special Tobacco Fertilizer.....	8	3	3
Detrick's Vegetator Ammoniated Superphosphate...	8	2.50	3
Detrick's Kangaroo Komplete Kompond.....	8	2	3
Detrick's Royal Crop Grower.....	8	2	2
Detrick's Fish Mixture.....	8	2	2
Detrick's Ammoniated Bone.....	8	2	1.50
Detrick's Victory Alkaline Bone.....	12	..	5
Detrick's P. and B. Special.....	12	..	3
Detrick's Soluble Bone Phosphate and Potash.....	10	..	2
Detrick's XXtra Acid Phosphate.....	14	..	..
Lazaretto Truck Grower.....	5	10	3
Lazaretto Truckers' Favorite.....	6	7	5
Lazaretto Early Trucker.....	7	5	5
Lazaretto Challenge Fertilizer.....	8	3	3
Lazaretto Special for Tobacco and Potatoes.....	8	3	3
Lazaretto Climax Plant Food.....	8	2.50	3
Lazaretto Universal Compound.....	8	2.50	2
Lazaretto Crop Grower.....	8	2	2
Lazaretto High Grade Dissolved Bone and Potash..	12	..	5
Lazaretto Alkaline Bone Phosphate.....	12	..	3
Lazaretto Dissolved Bone and Potash.....	10	..	2
Lazaretto Acid Phosphate.....	14	..	2
Canton Chemical Truckers' Special 10 Per Cent....	5	10	3
Canton Chemical Truckers' Special 7 Per Cent.....	6	7	5
Canton Chemical Excelsior Trucker.....	7	5	5
Canton Chemical Baker's Tobacco Fertilizer.....	8	3	3
Canton Chemical Superior High Grade Fertilizer...	8	3	3
Canton Chemical C. C. Special Compound.....	8	2.50	6
Canton Chemical Baker's Standard High Grade Guano	8	2.50	3
Canton Chemical Virginia Standard High Grade Manure.....	8	2.50	2
Canton Chemical Game Guano.....	8	2	2
Canton Chemical Soluble Alkaline Bone.....	12	..	3
Canton Chemical Soluble Bone and Potash.....	10	..	2
Canton Chemical Baker's Dissolved S. C. Bone.....	14	..	..
Bull Head Potato and Vegetable Manure.....	6	5	7
Honey Pod Trucker.....	7	5	8
Bell's Victoria Animal Bone Compound.....	9	2.25	4
Lazaretto Retriever Animal Bone Fertilizer.....	9	2.25	4
Canton Chemical Animal Bone Fertilizer.....	9	2.25	4
Detrick's Superior Animal Bone Fertilizer.....	9	2.25	4
Slingluff's British Mixture.....	8	2.50	2.50
Zell's Fish Guano	8	2	2
Enterprise Alkaline Phosphate	8	..	5

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>American Fertilizer Co., Norfolk, Va.—</i>			
10 Per Cent Ammonia Guano.....	7	10	2.50
Standard 7 Per Cent Ammoniated Guano.....	7	7	5
American Irish Potato Grower.....	7	5	5
American 7-7-7 for Irish Potatoes.....	7	7	7
Special Potato Manure.....	6	5	7
Special Potato Guano.....	7	5	7
Strawberry Guano	9	3.50	9
Stable Manure Substitute.....	7	3	4
American Fish Scrap Guano.....	7	4	4
Kale, Spinach and Cabbage Guano.....	7	5	4
American Ammoniated Bone.....	8	2	1
Peruvian Mixture	8	2	1.50
American No. 1 Fertilizer.....	8	2.50	3
American No. 2 Fertilizer.....	8	2	2
Blood and Bone Compound.....	8	2.50	1
Bone and Peruvian Guano.....	8.50	2	2.10
Bone and Peruvian Guano for Tobacco.....	8	2	2
American Cotton Compound.....	8	2	2
Bob White Fertilizer for Tobacco.....	8	2.50	2.50
American Eagle Guano.....	8	3	3
Murray's Special Fertilizer.....	8	3	3
J. G. Miller & Co.'s Yellow Leaf Tobacco.....	8	3	3
Special Formula Guano for Yellow Leaf Tobacco...	9	3.50	5
Pitt County Special Fertilizer.....	9	3.50	5
Double Dissolved Bone and Potash.....	10	..	4
American Special Potash Mixture for Wheat.....	8	..	2
Dissolved Bone and Potash for Corn and Wheat....	10	..	2
American High Grade Acid Phosphate.....	16	..	..
High Grade Acid Phosphate.....	14	..	..
Eagle High Grade Acid Phosphate.....	13	..	..
Acid Phosphate	12	..	..
Acid Phosphate	10	..	..
A. L. Hannok's Special Formula Guano.....	8	2	2
Bone and Peruvian Guano.....	8	2	2
Peruvian Mixture Guano especially prepared for Sweet Potatoes	8	4	5
Pure Dissolved Bone.....	14	2.50	..
Ground Fish Scrap.....	..	10	..
Bone Meal	21	4.50	..
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	49
Muriate of Potash.....	..	..	50
W. B. Cooper's High Grade Acid.....	14	..	..
W. B. Cooper's Cape Fear Acid.....	13	..	..
W. B. Cooper's Cotton Grower	8	2	2
W. B. Cooper's Pure German Kainit.....	..	..	12
N. C. and S. C. Cotton Grower.....	8	4	4

The John L. Bailey Co., Elm City, N. C.—

Stag Brand	8	2	2
Fairmount	8	3	3

Baugh & Sons Co., Philadelphia, Pa., and Norfolk, Va.—

Baugh's 5-6-5 Guano.....	6	5	5
Baugh's Sweet Potato Guano.....	8	3	3
Baugh's 16 Per Cent Acid Phosphate.....	16	..	..
Baugh's Fine Ground Fish.....	10	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Baugh's High Grade Acid Phosphate.....	14	..	..
Baugh's Soluble Alkaline Superphosphate.....	10	..	2
Baugh's High Grade Potash Mixture.....	10	..	4
Baugh's 12-5 Phosphate and Potash.....	12	..	5
Baugh's Cabbage Guano.....	6	7	5
Baugh's Fruit and Berry Guano.....	8	3	10
Baugh's Wheat Fertilizer for Wheat and Grass....	8	2	2
Baugh's Fish Bone and Potash.....	8	4	4
Baugh's Fish Mixture	8	2	2
Baugh's 7 Per Cent Potato Guano.....	6	7	5
Baugh's New Process 10 Per Cent Guano.....	5	10	2.50
Baugh's Grand Rapid High Grade Truck Guano....	8	3	3
Baugh's High Grade Tobacco Guano.....	8	3	3
Baugh's Animal Bone and Potash Compound.....	8	2	2
Baugh's Pure Dissolved Animal Bone.....	13	2.50	..
Baugh's Raw Bone Meal.....	21.50	4.50	..
Baugh's Peruvian Guano Substitute for Potatoes and all Vegetables	6	5	7
Baugh's Double Eagle Twenty-five Dollar Phosphate and Raw Bone Superphosphate.....	8	2	1
Glover's Special Potato Grower.....	7	4	8
Bentholl's Cotton and Peanut Grower.....	8	2	2
Genuine German Kainit.....	..	..	12
Fine Ground Blood.....	..	16	..
Nitrate of Soda.....	..	18.50	..
Sulphate of Ammonia.....	..	25	..
High Grade Sulphate of Potash.....	..	..	48
Muriate of Potash.....	..	..	48
Baugh's Special Tobacco Guano.....	8	3	5
Baugh's High Grade Cotton and Truck Guano.....	10	2	2
Baugh's Special Manure for Melons.....	10	4	4
Baugh's Potato and Truck Special.....	7	3.50	7
Baugh's Complete Animal Bone Fertilizer.....	8	2	5
Baugh's Special Potato Manure.....	5	2	10
Baugh's Special Guano.....	8	4	6

R. J. Blackwell, Marion, S. C.—

German Kainit	12
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*Bradley Fertilizer Co., Boston, Mass., and
Charleston, S. C.—*

B. D. Sea Fowl Guano.....	9	2.25	1
Bradley's Patent Superphosphate.....	9	2.25	1
Bradley's High Grade Guano.....	8	3	3
Bradley's Ammoniat'd Dissolved Bone.....	8	2.25	1
Eagle Ammoniated Bone Superphosphate.....	8	2.25	1
Bradley's Cereal Guano.....	8	2	2
Bradley's X Guano.....	8	2	2
Bradley's Wheat Guano.....	10	..	2
Bradley's High Grade Acid Phosphate.....	14	..	..
Bradley's XXX Acid Phosphate.....	13	..	..
Bradley's Acid Phosphate.....	12	..	..
Bradley's Palmetto Acid Phosphate.....	12	..	..
German Kainit .....	..	..	12
Bradley's Bone and Potash.....	10	..	2
Bradley's O. Special Guano.....	8	4	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Burton's Best	8	3	3
Burton's Butcher Bone.....	8	2	2
Burton's Soluble Guano.....	8	2	1
Burton's High Grade.....	8	2.50	3
Burton's High Grade Tobacco.....	8	4	4
Tobacco Queen	8	3	3
Acid Phosphate	14	..	..
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Resolute Acid Phosphate 16 Per Cent.....	16	..	..
Laurel Potash Mixture.....	10	..	2
Victory Special Crop Grower.....	7	4	4
Berkley Plant Food.....	10	..	4
Berkley Bone and Potash Mixture.....	11	..	2
Berkley Genuine German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Berkley Acid Phosphate.....	14	..	..
Berkley Ammoniated Superphosphate.....	8	2	1
Mascot Truck Guano.....	7	5	5
Royal Truck Grower.....	6	7	5
Advance Crop Grower.....	8	3	3
Berkley Tobacco Guano.....	8	3	3
Brandon Superphosphate	8	2	2
Select Crop Guano.....	8.50	2.50	2.50
Monitor Animal Bone Fertilizer.....	9	2.25	4
<i>William Bragaw & Co., Washington, N. C.—</i>			
Pamlico Trucker	7	5	8
Tar Heel Special Guano.....	8	2	2
Havana Tobacco Guano	8	3	3
Beaufort County Guano	8	3	3
Tuckahoe Tobacco Guano	8	2.50	3
Chocowinity Special Tobacco	5	4	6
Old Reliable Premium	8	2	2
Cotton-seed Meal .....	..	7.50	..
<i>Blackstone Guano Co., Inc., Blackstone, Va.—</i>			
Old Bellefonte	8	4	2
Jim Crow for Tobacco.....	8	3	3
Red Letter	8	2	2
Red Warrior for Tobacco.....	9	3	3
Blackstone Special for Tobacco.....	9	3	3
Alliance Guano	8	2	2
Alliance Guano for Tobacco	8	2	2
B. G. Co. Inc. Mixed Bone and Potash.....	10	..	4
B. G. Co. Inc. Mixed Acid Phosphate.....	14	..	..
Hard Cash	8	2.50	2
Bellefonte.....	8	3	2
<i>Best & Thompson, Goldsboro, N. C.—</i>			
Pure German Kainit.....	..	..	12
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano	8	3	3
Clayton Cotton Grower.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Columbia Guano Co., Norfolk, Va.—</i>			
Columbia 7 Per Cent Truck Guano.....	7	7	7
Columbia Potato Guano	7	5	5
Columbia Special Truck Guano	8	4	4
Columbia Soluble Guano	8	2	2
Columbia Special 4-8-3.....	8	4	3
Columbia H. G. Special Tobacco Guano.....	8	2.50	2
Columbia Special Wheat Fertilizer.....	8	2	2
Columbia Special	8	4	3
Columbia C. S. M. Special.....	9	2.75	2
Columbia 8 and 2 Bone and Potash Mixture.....	8	..	2
Columbia 8 and 2.25 Bone and Potash Mixture.....	8	..	2.25
Columbia 8 and 4 Bone and Potash Mixture.....	8	..	4
Columbia Bone and Potash Mixture.....	10	..	2
Columbia Bone and Potash for Grain.....	10	..	3
Columbia 10 and 4 Bone and Potash Mixture.....	10	..	4
Columbia Acid Phosphate	12	..	..
Columbia H. G. Dissolved Bone.....	13	..	..
Columbia 14 Per Cent Acid Phosphate	14	..	..
Columbia H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Rex Brand Ammoniated Guano.....	8	2.50	1
Carolina Soluble Guano	8	2	1
Crown Brand Peanut Guano	7	..	5
McRae's Special	9	5	7
Hayes' Special	8	4	3
Crews' Special	5	5	10
McRae's High Grade Guano	8	4	7
Pellican Ammoniated Guano	8	4	4
Hyeo Tobacco Guano	8	3	3
Olympia Cotton Guano.....	8	3	3
Genuine German Kainit .....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Cotton-seed Meal .....	..	7.50	..
Our Best Meal Guano	8	3	3
<i>Cumberland Bone and Phosphate Co., Portland, Maine, and Charleston, S. C.—</i>			
Cumberland Bone and Superphosphate of Lime....	8	2.25	1
<i>Cowell, Swan & McCotter Co., Bayboro, N. C.—</i>			
Cowell, Swan & McCotter Co.'s Bone Phosphate.....	14	..	..
Cowell, Swan & McCotter Co.'s Crop Guano.....	8	2	2
Cowell, Swan & McCotter Co.'s Bone and Fish.....	8	2	2
Cowell, Swan & McCotter Co.'s 14 Per Cent Acid Phosphate	14	..	..
Cowell, Swan & McCotter Co.'s Rust Proof Cotton Guano	8	2	3
Cowell, Swan & McCotter Co.'s Standard Cotton Grower.....	8	4	3
Cowell, Swan & McCotter Co.'s Quick Grower Guano	8	2.50	3
Cowell, Swan & McCotter Co.'s Great Cabbage and Potato Guano	7	7	7
Cowell, Swan & McCotter Co.'s Aurora Trucker....	7	5	7
Cowell, Swan & McCotter Co.'s Oriental Trucker....	7	5	8
Cowell, Swan & McCotter Co.'s High Grade Truck Guano	7	5	5

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Cowell, Swan & McCotter Co.'s Potato Favorite Guano	7	4	7
Cowell, Swan & McCotter Co.'s Champion Guano....	8	3	3
Cowell, Swan & McCotter Co.'s German Kainit....	..	..	12
Cowell, Swan & McCotter Co.'s Tobacco Guano.....	8	3	3
Cowell, Swan & McCotter Co.'s Cabbage Guano.....	5	10	2.50
<i>Graven Chemical Co., New Bern, N. C.—</i>			
Elite Cotton Grower	8	2	2
Duplin Tobacco Guano	8	3	3
Trent Bone and Potash	10	..	2
Neuse Truck Guano	6	6	6
Pantego Potato Guano	7	5	7
Marvel Great Crop Grower	8	2.50	3
Hanover Standard Guano	8	4	4
Gaston High Grade Fertilizer.....	8	3	3
Panama Prolific Crop Grower	8	2.50	3
Manteo Tobacco Guano	8	3	3
Wiona Guano	8	2.50	3
Genuine German Kainit .....	..	..	12
New Bern Bone and Potash	12	..	4
Jewel Acid Phosphate	14	..	..
<i>Calder Bros., Wilmington, N. C.—</i>			
Muriate of Potash .....	..	..	50
Genuine German Kainit .....	..	..	12
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Ben Hur H. G. Guano.....	10	3	3
Chickamauga H. G. Fertilizer	10	2	2
H. G. Plant Food, C. S. M.	10	2	2
Fish Scrap Guano	10	2	2
Complete Fertilizer	8	2	2
Blood and Bone	9	2	1
Standard Corn Grower	8	2	2
Bone and Potash	10	..	2
Wheat and Corn Grower	10	..	4
13-4	13	..	4
High Grade Dissolved Bone No. 16.....	16	..	..
High Grade Dissolved Bone.....	14	..	..
Dissolved Bone	12	..	..
Alkaline Bone	8	..	4
Special Corn Compound.....	10	2	4
Special Wheat Compound	10	2	4
Special Vegetable Compound.....	10	2	4
Georgia Homestead Guano.....	8	2	2
<i>Contentnea Guano Co., Wilson, N. C.—</i>			
Contentnea Tobacco Grower	8	3	3
Contentnea Cotton Grower	8	3	2.50
Pick Leaf Tobacco Special	8	3.50	5
Top Notch Guano	8	2	2
Woodard's Blood and Bone Cotton Compound.....	8	2	2
<i>W. B. Cooper, Wilmington, N. C.—</i>			
Muriate Potash .....	..	..	50
Nitrate Soda .....	..	18	..
Kainit.....	..	..	12

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—</i>			
Horne's Best Guano	8	3	3
Planters' Pride Guano	8	2.50	3
Caraleigh Top Dresser	3	10	4
Caraleigh Special Tobacco Grower.....	8	2.50	3
Pacific Tobacco and Cotton Grower.....	9	2.75	2
Eclipse Ammoniated Guano	8	2.50	2
Eli Ammoniated Guano	8	2	2
Crown Ammoniated Guano	8	2	1.50
Comet Guano	8	2	1
Horne & Son's High Grade Bone and Potash.....	11	..	5
Special Bone and Potash Mixture.....	10	..	4
Climax Dissolved Bone.....	14	..	..
Buncombe Wheat Grower	8	..	4
Electric Bone and Potash	10	..	2
Sterling High Grade Acid Phosphate.....	13	..	..
Staple Acid Phosphate	12	..	..
Dandy Acid Phosphate	10	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Morris and Scarboro's Special Bone and Potash....	10	..	3
Genuine German Kainit .....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash .....	..	..	50
Muriate of Potash.....	..	..	50
Bone Meal	(Total) 20	4.75	..
<i>The Coe-Mortimer Co., Charleston, S. C.—</i>			
Bone Meal	(Total) 20	4.75	..
Genuine Peruvian Guano	20	4	2.75
Genuine Peruvian Guano.....	9	9	2
Kainit.....	..	..	12
Sulphate.....	..	..	48
Muriate of Potash .....	..	..	49 & 50
Nitrate of Soda .....	..	18	..
Basic Slag	(Total) 17	..	..
<i>W. H. Camp, Petersburg, Va.—</i>			
Camp's Prepared Chemicals No. 1.....	8	3.50	7.50
Camp's Prepared Chemicals No. 3.....	8	2.75	2
Camp's Prepared Chemicals for Potatoes.....	7	7.50	10
Camp's Lion Brand.....	8	3	3
<i>Crow Fertilizer Co., Monroe, N. C.—</i>			
Crow's 14 Per Cent Acid Phosphate.....	14	..	..
Union County Special.....	8	2	2
Crow's Blood and Fish.....	8	3	3
Muriate of Potash.....	..	..	50
Kainit .....	..	..	12
<i>Dixie Guano Co., Raleigh, N. C.—</i>			
Old Plantation Superphosphate	8	2	2
Sulky Plow Brand	8	3	2
Radium.....	8	4	5
Carolina Special Ammoniated	8	3	3
Jeff Davis Special	9	2.75	2
Dixie Star Ammoniated	8	2	1
Dixie Champion for Wheat and Corn.....	10	..	1.50
Battle's Blood and Bone	8	2.50	3
Niagara Soluble Bone	8	2.50	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Etiwan Fertilizer Co., Charleston, S. C.—</i>			
Etiwan High Grade Acid Phosphate	14	..	..
Etiwan High Grade Cotton Fertilizer	8	3	3
Etiwan Special Cotton Fertilizer	8	4	4
Etiwan Dissolved Bone	13	..	..
Etiwan Soluble Bone with Potash	10	..	3
Etiwan Potash Bone	10	..	4
Etiwan Special Potash Mixture	8	..	4
Etiwan Ammoniated Fertilizer	8	2	2
Etiwan Cotton Compound	8	3	3
Etiwan Acid Phosphate with Potash.....	11	..	1
Etiwan Ammoniated Dissolved Bone.....	8.65	2	2
Etiwan Blood and Bone Guano.....	8	2.50	1
Diamond Soluble Bone.....	13	..	..
Diamond Soluble Bone with Potash.....	10	..	2
Plow Brand Ammoniated Dissolved Bone.....	8.65	2	2
Plow Brand Ammoniated Fertilizer.....	8	2	2
Plow Brand Raw Bone Superphosphate.....	8	2.50	1
Plow Brand Special Tobacco Fertilizer.....	8	4	4
Plow Brand Acid Phosphate with Potash.....	11	..	1
XX Acid Phosphate with Potash.....	10	..	2
Genuine German Kainit.....	..	..	12

Farmers Guano Co., Raleigh, N. C.—

Farmers' High Grade Acid Phosphate.....	13
16 Per Cent Acid Phosphate.....	16	..	..
State Standard Guano.....	8	2	2
Big Crop Guano.....	8	2.50	3
Century Bone and Potash Mixture.....	10	..	2
Special Bone and Potash Mixture.....	10	..	4
14 Per Cent Acid Phosphate.....	14	..	..
Golden Grade Guano.....	8	3	3
Toco Tobacco Guano.....	8	2.50	3
Bone Meal	(Total) 20	4.75	..

W. S. Farmer & Co., Baltimore, Md.—

W. S. Farmer & Co.'s Fish Mixture.....	8	2	2
Tampico.....	8	2	2
Hawk Eye	8	3	3
Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Nitrate of Soda .....	..	10	..

Farmers Cotton Oil Co., Wilson, N. C.—

Dean's Special Guano.....	8	4.50	7
Golden Gem Guano.....	8	3	3
Graves' Cotton Grower Guano.....	8	3	3
Planters' Friend Guano.....	8	2.50	3
Carolina Choice Tobacco Guano.....	8	2.50	3
Wilson High Grade Guano.....	8	2.75	2
Farmers Special Guano.....	8	2	2
Crop King Guano.....	8	2	2
Xtra Good Bone and Potash.....	10	..	2
16 Per Cent Acid Phosphate.....	16	..	..
Bonum Acid Phosphate.....	14	..	..
Contentnea Acid Phosphate.....	13	..	..
Regal Acid Phosphate.....	12	..	..
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
German Kainit .....	..	..	12
J. D. Farrar's Special Guano for Cotton and Tobacco ..	8	3	3
Perfect Top Dresser.....	2	10	5
Wilson Top Dresser.....	2	11	4
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Regal Tobacco Guano.....	8	3.50	5
<i>Germofert Manufacturing Co., Charleston, S. C.—</i>			
Germofert Patent Potato Manure.....	..	5	6
Germofert Patent Cabbage Fertilizer.....	..	6	7
Germofert Patent Wheat and Grain Compound.....	..	3	7
Germofert Patent Vegetable Guano.....	..	4	6
<i>W. R. Grace, New York, N. Y.—</i>			
Nitrate of Soda.....	..	18.50	..
<i>Greensboro Cotton Oil Co., Greensboro, Ala.—</i>			
Cotton-seed meal .....	...	7.50	..
<i>Griffith & Boyd, Baltimore, Md.—</i>			
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
Spring Crop Grower.....	6.50	2	4.50
Growers' Favorite	8	4	4
Beef Blood and Bone.....	8	2.50	1
Ammoniated Bone Phosphate.....	8	2	2
<i>Home Fertilizer Chemical Co., Baltimore, Md.—</i>			
Cerealite Top Dressing.....	..	9	2.50
Boykin's Home Potato Grower.....	6	4	4
Phenix Crop Grower.....	8	3	3
Boykin's Cereal Fertilizer.....	8	2	2
Boykin's Dissolved Animal Bone.....	12	2	..
Boykin's Alkaline Bone.....	10	..	2
Boykin's Vegetable Fertilizer.....	6	5	6
Boykin's High Grade Acid Phosphate.....	14	..	..
Boykin's Royal Potato Fertilizer.....	6	7	5
Home Fertilizer .....	..	7	7
Yancey's Formula for Yellow Leaf Tobacco.....	8	3	2
German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
<i>The Hubbard Fertilizer Co., Baltimore, Md.—</i>			
Hubbard's Trucker 7 Per Cent Royal Seal Co.....	6	7	5
Hubbard's Trucker 10 Per Cent Guano.....	4	10	4
Hubbard's 5 Per Cent Truck Guano.....	6	5	5
Hubbard's Jersey Trucker.....	8	2	10
Hubbard's Royal Ensign.....	8	3	4
Hubbard's Yellow Wrapper Guano.....	8	3	3
Hubbard's Exchange Guano.....	8	2	2
Hubbard's Standard Bone Superphosphate.....	8	2	3
Hubbard's Soluble Bone and Potash.....	10	..	2
Hubbard's Special Mixture of Bone and Potash.....	10	..	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
German Kainit .....	..	..	12.40
Long's Favorite	8	2.50	3
Hubbard's H. G. Soluble Tennessee Phosphate.....	14	..	..
<i>M. P. Hubbard & Co., Baltimore, Md.—</i>			
Hubbard's Maryland Special Vegetable Grower....	7	5	5
<i>The Hampton Guano Co., Norfolk, Va.—</i>			
Dauntless Potash Mixture.....	10	..	2
Supreme Acid Phosphate 16 Per Cent.....	16	..	..
Hampton Crop Grower.....	10	..	4
Hampton Bone and Potash Mixture.....	11	..	2
Hampton Acid Phosphate.....	14	..	..
Hampton Ammoniated Superphosphate.....	8	2	1
Hampton Tobacco Guano.....	8	3	3
Arlington Animal Bone Fertilizer.....	9	2.75	4
Alpha Crop Grower.....	8.50	2.50	2.50
Shirley Superphosphate	8	2	2
Little's Favorite Crop Grower.....	7	4	4
Reliance Truck Guano.....	7	5	5
Virginia Truck Grower.....	6	7	5
P. P. P. Princess Prolific Producer.....	8	3	3
Hampton Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
<i>Hardison Co., Wadesboro, N. C.—</i>			
Nitrate of Soda.....	..	18	..
<i>Humphreys-Godwin & Co., Memphis, Tenn.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>S. B. Harrell & Co., Norfolk, Va.—</i>			
Harrell's Champion Cotton and Peanut Grower... ..	8	2	2
Harrell's Truck Guano.....	6	7	5
Harrell's Acid Phosphate.....	14	..	..
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial Martin County Special Crop Grower.....	9	2.75	2
Imperial Fish and Bone.....	6	4	4
Imperial X. L. O. Cotton Guano.....	8	3	3
Imperial 5-6-7 Potato Guano.....	6	5	7
Imperial Williams' Special Potato Guano.....	6	5	5
Imperial Tobacco Guano.....	8	3	3
Imperial Sweet Potato Guano.....	6	2	6
Imperial 10 Per Cent Guano.....	5	10	2.50
Imperial 7-7-7 Potato Guano.....	7	7	7
Imperial Special 7 Per Cent Guano for Potatoes....	5	7	5
Imperial Champion Guano.....	8	2	2
Imperial Laughinghouse Special Tobacco Guano....	4	4	6
Imperial Cubanola Tobacco Guano.....	4	3	5
Imperial Ciseo Soluble Guano.....	8	2	2
Imperial Lucky Strike Potato Guano.....	7	5	8
Imperial Cotton Grower.....	8	2	1.50
Imperial Peanut and Corn Guano.....	8	2	2
Imperial Standard Premium.....	8	2	1.50
Imperial High Grade Acid Phosphate.....	14	..	..
Imperial Tennessee Acid Phosphate.....	16	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Imperial Bone and Potash.....	10	..	2
Imperial Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
Imperial Guano for Bright Tobacco.....	8	2.50	3
Imperial 17 Per Cent Acid Phosphate.....	17	..	..
Imperial High Grade Sweet Potato Guano.....	7	5	6
<i>Wm. Krogan, Asheville, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>R. L. Kirkwood & Co., Bennettsville, S. C.—</i>			
Nitrate of Soda.....	..	18	..
<i>Lorene Cotton-seed Oil Mills, Mooresville, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Lester's Agricultural Chemical Works, Newark, N. J.—</i>			
Lester's Standard Pure Bone Superphosphate.....	9	2	2
Lester's Success Fertilizer.....	8	2	2
Lester's Ammoniated Dissolved Bone Fertilizer....	8	2.50	2
<i>A. S. Lee & Sons Co., Richmond, Va.—</i>			
Lee's Special Corn Fertilizer.....	8	..	2
Lee's Plant Bed Fertilizer.....	8	2	2
Lee's Special Wheat Fertilizer.....	8	..	2
Lee's Prepared Agricultural Lime.....	..	..	2
Lee's High Grade Bone and Potash.....	9	..	4
<i>The Mapes Formula and Peruvian Guano Co., New York, N. Y.—</i>			
Complete Manure "A" Brand.....	10	3	2.50
Mapes' Economical Potato Manure.....	4	4	8
Mapes' Corn Manure.....	8	3	6
Mapes' Vegetable or Complete Manure for Light Soils	6	6	6
<i>D. B. Martin Co., Richmond, Va.—</i>			
Martin's 7 Per Cent Guano.....	6	7	5
Martin's Early Truck and Vegetable Grower.....	6	4	8
Martin's Claremount Vegetable Grower.....	7	3	5
Martin's Red Star Brand.....	6	5	5
Martin's Bull Head Fertilizer.....	8	3	3
Martin's Tobacco Special.....	8	3	3
Martin's Carolina Cotton Fertilizer.....	8	2	2
Martin's Old Virginia Favorite.....	8	2	2
Martin's Corn and Cereal Special.....	8	2	2
Martin's Raw Bone Meal..... (Total)	21	4.50	..
Martin's Pure Ground Bone..... (Total)	22.90	2	..
Martin's Animal Bone and Potash Compound.....	16	2	2.50
Martin's Pure Dissolved Animal Bone.....	12	2	..
Martin's Acid Phosphate.....	16	..	..
Martin Acid Phosphate.....	14	..	..
Martin's Potash and Soluble Bone.....	12	..	5
Martin Potash and Soluble Bone.....	12	..	3
Martin Potash and Soluble Bone.....	10	..	5
Martin's Potash and Soluble Bone.....	10	..	2
Pure Ground Bone..... (Total)	22.90	3	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
Martin's Animal Tankage (ground).....	16	6	..
Martin's Gilt-edge Potato Manure.....	3	7	10
Martin's High Grade Blood.....	..	17	..
Martin's Blood .....	..	15	..
Martin's Animal Bone Potato Manure.....	6	5	7
Blood .....	..	15	..
Blood .....	..	12	..
Blood .....	..	13	..
<i>Morgan Oil and Fertilizer Co., Red Springs, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Thomas Meehan & Sons, Inc.—</i>			
Meehan Canada Hardwood Ashes.....	..	..	5.32
Meehan Bone Meal..... (Total)	20	4	..
<i>E. H. and J. A. Meadows, New Bern, N. C.—</i>			
Meadows' Cotton Guano.....	8	2	2
Meadows' All Crop Guano.....	8	2.50	2.50
Meadows' Roanoke Guano.....	8	2.50	3
Meadows' Gold Leaf Tobacco.....	8	3	3
Meadows' Sea Bird Guano.....	8	4	2.50
Meadows' Labos Guano.....	8	5	5
Meadows' Great Potato Guano.....	7	5	8
Meadows' Great Cabbage Guano.....	7	7	7
Meadows' 10 Per Cent Ammoniated Guano.....	6	10	2.50
Meadows' Dissolved Bone and Potash Compound....	10	..	4
Meadows' Dissolved Bone and Potash Compound....	10	..	2
Meadows' Diamond Acid Phosphate.....	14	..	..
Meadows' Genuine German Kainit.....	..	..	12
<i>The Miller Fertilizer Co., Baltimore, Md.—</i>			
Standard Phosphate.....	8	3	3
Ammoniated Dissolved Bone.....	8	2	2
Miller's Irish Potato.....	8	4	4
Tobacco King	8	3	3
High Grade Potato.....	6	5	7
Standard Potato	8	3	3
Profit	8	2	2
Potato and Vegetable Grower.....	8	2	4
No. 1 Potato and Vegetable Grower.....	8	4.50	7
Corn and Peanut Grower.....	10.50	..	2.25
S. C. Rock.....	14	..	..
Farmers' Profit	8	2	2
Cotton Queen	8	2	1
Trucker	8	5	5
Miller's 7 Per Cent.....	7	7	7
Harmony	8	2.50	3
Clinch	10	..	2
Potato Mixture	10	..	4
4 Per Cent Tobacco.....	8	4	4
Kainit .....	..	..	12
Miller's 16 Per Cent Acid Phosphate.....	16	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The MacMurphy Co., Charleston, S. C.—</i>			
Special 9-3-3 Guano.....	9	3	3
Special 8-3-3 Cotton and Corn Guano.....	8	3	3
Special 8-2-2 Cotton and Corn Guano.....	8	2	2
High Grade Acid Phosphate 16 Per Cent.....	16	..	..
High Grade Acid Phosphate 14 Per Cent.....	14	..	..
High Grade Acid Phosphate.....	13	..	..
Wilcox & Gibbs Co.'s Manipulated Guano.....	9	2.75	2
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	48
Pure German Kaint.....	..	..	12
<i>John F. McNair, Laurinburg, N. C.—</i>			
Genuine German Kainit.....	..	..	12
<i>Navassa Guano Co., Wilmington, N. C.—</i>			
Navassa Cotton Fertilizer.....	8	2	2
Navassa Grain Fertilizer.....	8	2	2
Navassa Cotton-seed Meal Guano.....	8	2	2
Navassa Fruit Growers' Fertilizer.....	8	2	6
Navassa Universal Fertilizer.....	8	2.50	1
Navassa Guano for Tobacco.....	8	2.50	2
Navassa Strawberry Top Dressing.....	8	2.50	4
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8	3	2
Navassa High Grade Guano.....	8	3	3
Navassa Complete Fertilizer.....	8	2	1
Navassa Blood and Meal Mixture.....	8	3	5
Navassa Carib Guano.....	8	3	10
Navassa Special Truck Guano.....	8	4	4
Navassa Creole Guano.....	6	5	7
Navassa Root Crop Fertilizer.....	7	5	7
Navassa Bone and Potash.....	8.50	..	2
Navassa Acid Phosphate with Potash.....	10	..	1
Navassa Dissolved Bone with Potash.....	10	..	2
Navassa Wheat Mixture.....	10	..	2.25
Navassa Wheat and Grass Grower.....	10	..	4
Navassa Gray Land Mixture.....	12	..	4
Navassa Special Wheat Mixture.....	12	..	4
Navassa Acid Phosphate	12	..	..
Navassa High Grade Dissolved Bone.....	13	..	..
Navassa 14 Per Cent Acid Phosphate.....	14	..	..
Navassa 16 Per Cent Acid Phosphate.....	16	..	..
Oceoneechee Tobacco Guano.....	8	2	2
Harvest King Guano.....	8	2	3
Croatan Acid Phosphate.....	10	..	..
Harvey's Bone and Potash Mixture.....	8	..	3
Warlick's Mixture	8	..	2.25
Coree Tobacco Guano.....	8	4	4
Orton Guano	8	3	4
Clarendon Tobacco Guano.....	8	3	3
Mogul Guano	8	2.50	3
Ammoniated Soluble Navassa Guano.....	8	2.50	2
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Nitrate of Soda.....	..	18	..
<i>N. C. Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8	2.75	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>New Bern Cotton Oil and Fertilizer Mills,</i> <i>New Bern, N. C.—</i>			
Pamlico Electric Top Dresser.....	5	10	2.50
Dunn's Standard Truck Grower.....	7	7	7
Ives' Irish Potato Guano.....	7	5	7
Craven Bright Tobacco Guano.....	8	3	3
Lenoir Bright Leaf Tobacco Grower.....	8	3	3
Craven Cotton Guano.....	8	2	2
Pitt's Prolific Golden Tobacco Guano.....	8	3	3
Foy's High Grade Fertilizer.....	8	3	3
Onslow Farmers' Reliance Guano.....	8	2.50	3
Jones County Premium Crop Grower.....	8	2.50	3
Green County Standard Fertilizer.....	8	2	2
Carteret Bone and Potash.....	10	..	2
14 Per Cent Acid Phosphate.....	14	..	..
Pot. Neck Tobacco Guano.....	8	4	4
High Grade Fertilizer.....	8	3	3
Bogue Fish Scrap.....	4	9	..
Cotton-seed Meal .....	..	7.50	..
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Oriole Tobacco Grower.....	8	4	4

Norfolk Fertilizer Co., Norfolk, Va.—

Oriano Tobacco Guano.....	8	3	3
Oriano Cotton Guano.....	8	2	2
Oriano 3-8-3 for Cotton.....	8	3	3
Oriano Crop Grower.....	8	3	3
Oriano C. S. M. Special.....	9	2.75	2
Oriano Bone and Potash.....	10	..	2
Oriano 14 Per Cent Acid Phosphate.....	14	..	..
Oriano 16 Per Cent Acid Phosphate.....	16	..	..
Genuine German Kainit.....	..	..	12

G. Ober & Sons Co., Baltimore, Md.—

Ober's Dissolved Bone Phosphate.....	14	..	..
Ober's Dissolved Bone Phosphate and Potash.....	10	..	2
Ober's Acid Phosphate with Potash.....	8	..	4
Ober's Complete Fertilizer.....	6	5	6
Ober's Special Compound for Tobacco.....	8	3	3
Ober's Standard Tobacco Fertilizer.....	8	2	2
Ober's Special High Grade Fertilizer.....	9	3	3
Ober's Special Ammoniated Dissolved Bone.....	9	2	2
Ober's Special Cotton Compound.....	8	2	2
Kainit .....	..	..	12
Ober's Nitrate of Soda.....	..	18	..
Ober's Muriate of Potash.....	..	..	48
Ober's High Grade Acid Phosphate.....	16	..	..
Cooper's Pungo Guano.....	8	2.50	2

The Pocomoke Guano Co., Norfolk, Va.—

Superb Acid Phosphate 16 Per Cent.....	16	..	..
10-2 Potash Mixture.....	10	..	2
Pocomoke Bone and Potash Mixture.....	10	..	4
Pocomoke Superphosphate.....	8.50	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Cinco Tobacco Guano.....	8.50	2.50	2.50
Monarch Tobacco Grower.....	8	3	3
Monticello Animal Bone Fertilizer.....	9	2.25	4
Crescent Complete Compound.....	8	2	3
L. P. H. Premium.....	8	2	2
Hornthal Tobacco Guano.....	8	2	3
Electric Crop Grower.....	8.50	2	2
Peerless Acid Phosphate.....	14	..	..
Pamlico Superphosphate.....	8	2	2
Alkali Bone	11	..	2
Harvey's High Grade Monarch.....	8	3	3
Faultless Ammoniated Superphosphate.....	7	4	4
Seaboard Popular Trucker.....	6	7	5
Standard Truck Guano.....	7	5	5
Freeman's 7 Per Cent Irish Potato Grower.....	6	7	5
Coast Line	5	10	3
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Pure Ground Bone..... (Total)	20	4.50	..
Nitrate of Soda.....	..	19	..
Faultless Ammoniated Superphosphate.....	7	4	4
<i>Pacific Guano Co., Boston, Mass., and Charleston, S. C.—</i>			
Soluble Pacific Guano	8.50	2	2
Pacific Special High Grade Fertilizer.....	8	3	3
Pacific Acid Phosphate.....	12	..	..
<i>Pocahontas Guano Co., Lynchburg, Va.—</i>			
Pocahontas Special Tobacco Fertilizer.....	9	3	3
Standard Tobacco Guano (Old Chief Brand).....	9	2	2
H. G. 4 Per Cent Tobacco Compound (Mohawk King).....	9	2.25	4
Spot Cash Tobacco Compound.....	8	2.50	3
Yellow Tobacco Special.....	9	2	2
Wabash Wheat Mixture.....	10	..	4
Cherokee Grain Special.....	8	..	4
Imperial Dissolved S. C. Phosphate.....	14	..	..
Farmers' Favorite (Apex Brand).....	8	3	3
Cherokee Cotton Grower.....	9	2	2
Black Hawk Brand.....	8	2.50	2
Red Bear Special.....	8	2.50	3
Indian Truck Grower.....	8	4	4
Big Joe Brand.....	8	2	1
Carrington's Superior Grain Compound.....	10	..	2
Carrington's Banner Brand Guano.....	8	2	2
Carrington's S. C. Phosphate (Waukesha Brand)...	16	..	..
Carrington's Superior Grain Compound No. 3.....	10	..	3
Carrington's Special Truck (Eagle Mt. Brand))....	8	2.50	6
Pure Raw Bone Meal..... (Total)	22	4.50	..
<i>Patapsco Guano Co., Baltimore, Md.—</i>			
Patapsco Special Tobacco Mixture.....	8	2.50	3
Unicorn Guano	8	2.50	3
Pilot Guano Special 4 Per Cent.....	10	2.50	4
Money Maker Guano.....	7	4.50	6
Patapsco Guano	9.25	2.50	2
Patapsco Guano for Tobacco.....	9.25	2.50	2
Patapsco Tobacco Fertilizer.....	9	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Patapsco Trucker for Early Vegetables.....	7	5	5
Patapsco Crop Dresser.....	4	4	4
Patapsco Potato Guano.....	6	5	7
Patapsco 7-7-7 Truck Guano.....	7	7	7
Patapsco 10-4 Potash Mixture.....	10	..	4
Patapsco High Grade Bone and Potash.....	11	..	5
Patapsco Soluble Bone and Potash.....	10	..	2
Patapsco Dissolved S. C. Phosphate.....	14	..	..
Choctaw Guano	8	3	3
Planters' Favorite	8	2	2
Sea Gull Ammoniated Guano.....	8	2	2
Baltimore Soluble Phosphate.....	11	..	2
Florida Soluble Phosphate.....	16	..	..
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..

*Planters Fertilizer and Phosphate Co.,
Charleston, S. C.—*

Planters' Blood, Bone and Potash.	8	2.50	1
Planters' High Grade Acid Phosphate.....	14	..	..
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	18	..
Planters' Special Truck.....	8	3	10

Z. V. Pate, Laurel Hill, N. C.—

Nitrate of Soda	18	..
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Peoples Cotton Oil Co., Selma, Ala.—

Cotton-seed Meal	7.50	..
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Powhatan Chemical Co., Richmond, Va.—

Powhatan Trucker	7	6	5
North State Special	8	4	4
P. C. Co.'s Hustler.....	8	3	3
Economic Cotton Grower	9	2.75	2
White Leaf Tobacco Fertilizer	8	2.50	3
King Brand Fertilizer	8	2.50	3
Magic Tobacco Grower	8	2	2
Magic Special Fertilizer	8	2	2
Magic Cotton Grower	8	2	2
Magic Mixture	8	2	1
Guilford's Special Tobacco Fertilizer.....	9	3	6
Magic Bone and Potash Mixture	10	..	4
Powhatan Bone and Potash Mixture.....	8	..	4
Magic Grain and Grass Grower.....	8	..	4
Magic Peanut Grower	8	..	4
Bone and Potash Mixture	10	..	2
Dixie Grain and Grass Grower	8	..	2
Magic Dissolved Bone Phosphate	16	..	..
Unecda Acid Phosphate	15	..	..
High Grade Acid Phosphate.....	14	..	..
Powhatan Acid Phosphate	13	..	..
Virginia Dissolved Bone	12	..	..
Magic S. C. Phosphate	10	..	..
Bone Meal	(Total) 25	3	..
Pure Raw Bone Meal	(Total) 20	4	..
Pure German Kainit .....	..	..	12

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Muriate of Potash.....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..
<i>Piedmont-Mt. Airy Guano Co., Baltimore, Md.—</i>			
Privott's Standard Guano.....	8	2.50	3
Privott's Special for Potatoes and Vegetables.....	8	2	6
Piedmont High Grade Ammoniated Bone and Potash	8	3	3
Piedmont Farmers' High Grade Bone and Potash...	10	..	2
Piedmont Special Farmers' Tobacco Guano	8	3	4
Piedmont Guano for Tobacco	8	2.50	3
Piedmont High Grade S. C. Bone Phosphate.....	14	..	..
Piedmont Special for Cotton, Corn and Peanuts....	8	2	2
Piedmont Early Vegetable Manure	6	5	7
Piedmont Cultivator Brand	8	2	2
Piedmont Bone and Peruvian Mixture	8	2	2
Piedmont Special Truck Fertilizer	6	7	5
Piedmont Essential Tobacco Compound	9	2	2
Piedmont Soluble Bone and Potash	8	..	2
Privott's 3-8-4 Guano	8	3	4
Levering's Potash Bone.....	10	..	4
Levering's Reliable Tobacco Guano	8	3	3
Genuine German Kainit .....	..	..	12
Nitrate of Soda .....	..	18.50	..
Muriate of Potash.....	..	..	50
Stowe Boss Select	8	4	4
Piedmont Vegetable Compounds.....	6	4	8
Piedmont Farmers' Standard	9	2	2
<i>Parson & Hall, Wadesboro, N. C.—</i>			
German Kainit .....	..	..	11
<i>Pine Level Oil Mills, Pine Level, N. C.—</i>			
Hale's Special for Tobacco.....	8	3	4
<i>The Quinnipiac Co., New York, N. Y., Charleston, S. C.—</i>			
Quinnipiac Pine Island Ammoniated Superphosphate	9	2.25	1
Quinnipiac Acid Phosphate.....	13	..	..
<i>F. S. Royster Guano Co., Norfolk, Va.—</i>			
Marlboro H. G. Cotton Grower	8	3	3
Bonanza Tobacco Guano	8	3	3
Farmers' Bone Fertilizer	8	2	2
Special Compound	8	2	1
Caledonia Compound	8	2	1
Arrow Brand Guano	8	2.50	1
Royster's Meal Mixture	9	2.75	2
Orinoco Tobacco Guano.....	8	2.50	3
Special Tobacco Compound	8	2.50	2
Cobb's High Grade for Tobacco	8	5	6
Royster's Special 10 Per Cent Truck Guano.....	5	10	3
Royster's Early Truck Guano	7	5	8
Royster's Special 7 Per Cent Truck Guano	7	7	7
Trucker's Delight	8	4	4
Royal Potato Guano	7	5	5
Royal Special Potato Guano	7	5	7
Ballentine's Potato Guano	6	7	7

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Royster's Special Sweet Potato Guano	8	3	3
Tomlinson's Special	9	3	5
Royster's Special 4-8-3	8	4	3
Royster's Special Wheat Fertilizer	8	2	2
Royster's Best Guano	8	4.50	7
Royster's Complete Guano	8	2	2
Royster's Special	8	4	3
Humphrey's Special for Tobacco.....	6	3.10	3.20
Harvey's Cabbage Guano	5	8	3
Royster's 4-9-5 Special	9	4	5
Williams' Special Guano	8	2.50	5
Magic Top Dresser.....	..	9	2.50
Royster's Peanut Special	7	..	5
Royster's Bone and Potash Mixture	10	..	2
Royster's 8-2 Bone and Potash Mixture.....	8	..	2
Royster's 10-4 Bone and Potash Mixture.....	10	..	4
Royster's 8-4 Bone and Potash Mixture.....	8	..	4
Royster's 8-2.25 Bone and Potash Mixture.....	8	..	2.25
Royster's Bone and Potash for Grain.....	10	..	3
Royster's H. G. Dissolved Bone.....	13	..	..
Royster's 14 Per Cent Acid Phosphate.....	14	..	..
Royster's XX Acid Phosphate.....	12	..	..
Royster's H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Genuine German Kainit .....	..	..	12
Muriate of Potash .....	..	..	48
Sulphate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Cotton-seed Meal .....	..	7.50	..
Eagle's Special Tobacco Guano.....	8	3	5
Royster's Bone and Potash Mixture.....	11	..	5

Read Phosphate Co., Charleston, S. C.—

Read's Special Potash Mixture.....	8	..	4
Read's High Grade Tobacco Leaf	8	3	3
Read's Bone and Potash	10	..	4
Read's Cotton Flower	8	2.50	1
Read's Blood and Bone Fertilizer No. 1.....	8	2	2
Read's Soluble Fish Guano	8	2	2
Read's High Grade Manipulated.....	9	2	3
Read's High Grade Dissolved Bone	14	..	..
Read's High Grade Cotton Grower	8	3	3
Read's High Grade Acid Phosphate	13	..	..
Read's Alkaline Bone.....	10	..	2
Genuine German Kainit .....	..	..	12

Richmond Guano Co., Richmond, Va.—

Perfection Special	8	4	4
Southern Trucker	8	5	5
Special High Grade for Truck.....	7	6	5
10 Per Cent Cabbage Guano.....	6	10	2
Gilt-edge Fertilizer	8	3	3
Carolina Cotton Grower	9	2.75	2
Carolina Bright Special Tobacco Fertilizer.....	8	2.75	2.50
Tip Top Fertilizer	8	2.50	3
Special Premium Brand for Tobacco.....	8	2.25	2.25
Special Premium Brand for Plants	8	2.25	2.25
Carolina Bright for Cotton	8	2.50	1.50
Premium Tobacco Fertilizer	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Premium Brand Fertilizer	8	2	2
Bone Mixture	8	2	1
Clark's Special Formula	7	6	6
Carter's Special Tobacco Fertilizer	4	3	6
Saunders' Special Formula for Bright Tobacco....	9	3.50	5
Burton's Special Tobacco Fertilizer	9	2.50	3
Premium Bone and Potash Mixture.....	13	..	3
Rex Bone and Potash Mixture	10	..	4
Tip-Top Bone and Potash Mixture.....	8	..	4
Winter Grain and Grass Grower	8	..	4
Premium Peanut Grower	8	..	4
Bone and Potash Mixture.....	10	..	2
Premium Grain and Grass Grower	8	..	2
Rex Dissolved Bone Phosphate	16	..	2
Regal Acid Phosphate.....	15	..	..
High Grade Acid Phosphate	14	..	..
High Grade Wheat and Grass Fertilizer.....	14	..	..
Premium Dissolved Bone	13	..	..
Dissolved S. C. Phosphate	12	..	..
Old Homestead Dissolved Bone	10	..	..
Edgecombe Cotton Grower	8	2	2
Hunter & Dunn's Dissolved Bone.....	13	..	..
Hunter & Dunn's Ammoniated Fertilizer.....	8	2	2
Hunter & Dunn's Special Ammoniated Fertilizer....	9	3	2.25
Bone Meal .....(Total)	25	3	..
Pure Raw Bone Meal .....(Total)	20	4	..
Pure German Kainit .....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..
Beeson's Special Fertilizer.....	8	2	6

Reidsville Fertilizer Co., Reidsville, N. C.—

Banner Fertilizer	8	2	1
Champion Guano	8	2	2
Lion Brand Fertilizer	9	3	6
Broad Leaf Tobacco Guano.....	9	2.25	2.50
Royal Fertilizer	8	3	3
Bone and Potash 10-4.....	10	..	4
Bone and Potash 8-2.....	8	..	2

Rasin-Monumental Co., Baltimore, Md.—

Rasin Bone and Potash	10	..	2
Rasin Special Bone and Potash.....	10	..	5
Rasin Empire Guano	8	2	2
Rasin Dixie Guano	8	2	1
Rasin Gold Standard Guano.....	8	3	3
Rasin 13 Per Cent Acid Phosphate.....	13	..	..
Rasin 16 Per Cent Acid Phosphate.....	16	..	..
Rasin Acid Phosphate	14	..	..

J. H. Roberson & Co., Robersonville, N. C.—

Roberson's Cotton Grower	9	2.75	2
Roberson's Potato Grower	6	7	5
Roberson's Special Potato Grower.....	7	7	7
Roberson's Bright Leaf Grower	8	2.50	3
Roberson's High Grade Acid Phosphate	14	..	..
Genuine German Kainit .....	..	..	12

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Swift Fertilizer Works, Atlanta, Ga.—</i>			
Swift's Blood, Bone, and Potash H. G. Guano.....	9.25	4	7
Swift's Corn and Cotton Grower H. G. Guano.....	10	3	3
Special High Grade Guano	9.25	5	3
Swift's Monarch High Grade Guano.....	8	4	4
Swift's Cotton King High Grade Guano.....	9	3	2
Swift's Farmers' Home High Grade Guano.....	9	2	3
Swift's Pioneer High Grade Tobacco Grower.....	8	2	4
Swift's Golden Harvest Standard Grade Guano....	8	2	2
Swift's Eagle High Grade Guano.....	10	2	2
Swift's Red Steer Standard Grade Guano	8	2	2
Swift's Cotton Plant Standard Grade Guano.....	8	2	1
Swift's Rivalist High Grade Guano.....	8	3	3
Swift's Special High Grade Phosphate and Potash..	12	..	6
Swift's Atlanta High Grade Phosphate and Potash..	12	..	4
Swift's Farmers' Home H. G. Phosphate and Potash	10	..	4
Swift's Plantation Standard Grade Phosphate and Potash	8	..	4
Swift's Wheat Grower Standard Grade Phosphate and Potash	10	..	2
Swift's Field and Farm Standard Grade Phosphate and Potash	10	..	2
Swift's Special High Grade Acid Phosphate.....	16	..	..
Swift's Cultivator High Grade Acid Phosphate.....	14	..	..
Swift's Harrow High Grade Acid Phosphate.....	13	..	..
Swift's Chattahoochee Standard Grade Acid Phos- phate	12	..	..
Swift's German Kainit.....	..	..	12
Swift's Pure Nitrate of Soda.....	..	18	..
Swift's Muriate of Potash.....	..	..	50
<i>Swift & Co., Chicago, Ill.—</i>			
Swift's Pure Raw Bone Meal..... (Total)	23	4	..
Swift's No. 1 Ground Tankage.....	6	10	..
Swift's Pure Bone Meal.....	25	3	..
Swift's Ground Dried Blood.....	..	16	..
<i>South Atlantic Oil Co., Wadesboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>The Southern Exchange Co., Mauston, N. C.—</i>			
The Coon Guano.....	8	2	2
The Racer Guano.....	8	2	3
The Walnut Fertilizer.....	8.50	2.50	2.50
Juicy Fruit Fertilizer.....	9	2.25	4
R. M. C. Special Crop Grower.....	8	3	3
Correct Cotton Compound.....	8	3	3
Jack's Best Fertilizer.....	8	3	3
Bull of the Woods Fertilizer.....	8	3	4
That Big Stick Guano.....	8	3	4
Two Fours Guano.....	7	4	4
S. E. C. Acid Phosphate.....	16	..	..
Acid Phosphate	14	..	..
McKimmion's Special Truck Formula.....	8	5	7
Melon Grower	8	5	7
S. E. C. Bone and Potash Mixture.....	10	..	4
Bone and Potash Mixture.....	10	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
<i>Southern Cotton Oil Co., Charlotte, Concord, Davidson, Gastonia, Shelby, Monroe, N. C.—</i>			
Peacock	8	3	3
Conqueror	8	4	4
Red Bull	8	2.50	2
Moon	8	3	3
King Bee	8.65	2	2
Magnolia	8.65	2	2
Gloria	8	2	2
First Call	8	2.50	1
Gold Seal	14	..	..
Sunrise	8	2.50	1
Silver King	13	..	..
Conqueror Bone and Potash.....	10	..	4
Magnolia Bone and Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
<i>Southern Chemical Co., Inc., Roanoke, Va.—</i>			
Our Favorite	8	2	2
Pride of Virginia.....	8	2	3
Farmers' Joy	8	2	4
<i>Tuscarora Fertilizer Co., Baltimore, Md.—</i>			
13 Per Cent Acid Phosphate.....	13	..	..
Acid Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Bone and Potash.....	10	..	2
Alkaline	10	..	5
Mamre Substitute	6	4	4
Big Four	7	2	4
Standard	8	2	2
Fruit and Potato.....	8	2	10
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Tobacco Special	8	3	3
Cotton Special	8	3	3
Special Trucker	8	4	4
Tuscarora Trucker	8	5	7
Animal Bone	24	3	..
Raw Bone Meal..... (Total)	22	4.50	..
Sulphate of Potash .....	..	..	50
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Kainit .....	..	..	12
<i>R. L. Upshur, Norfolk, Va.—</i>			
Upshur's Fish Bone and Potash Guano.....	8	2	4
Upshur's 5 Per Cent Guano.....	5	5	5
Upshur's 3-8-3 Cotton Guano.....	8	3	3
Upshur's Peanut Guano.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Upshur's G. G. and C. (Grain, Grass and Cotton)			
Guano	8	2	2
Upshur's Special Truck Guano.....	7	5	8
Upshur's 7 Per Cent Special Potato Guano.....	5	7	5
Upshur's 7 Per Cent Irish Potato Guano.....	6	7	5
Upshur's F. C. (Farmers' Challenge) Guano.....	6	7	6
Upshur's F. F. (Farmers' Favorite) Guano.....	7	5	6
Premo Cotton Guano.....	8	2	1.50
Upshur's Bone and Potash Guano.....	10	..	2
Upshur's High Grade Acid Phosphate.....	14	..	..
Upshur's High Grade Guano.....	8	3	3
Cotton-seed Meal Mixture.....	9	2.75	2
Genuine German Kainit.....	..	..	12

Union Guano Co., Winston, N. C.—

Union Potato Manure.....	8	2	1
Union Approved Crop Grower.....	8.65	2	2
Union Truck Guano.....	7	4	5
Union Perfect Cotton Grower.....	9	2.75	2
Union Mule Brand Guano.....	10	2	2
Union Waterfowl Guano.....	8	2.50	3
Union Homestead Guano.....	8	3	3
Union Standard Tobacco Grower.....	8	2.50	2
Union Premium Guano.....	8	4	4
Union Vegetable Compound.....	7	5	8
Union 10-4 Bone and Potash.....	10	..	4
Union Wheat Mixture.....	8	..	4
Union Bone and Potash.....	10	..	2
Union 10-6 Bone and Potash.....	10	..	6
Union 10-5 Bone and Potash.....	10	..	5
Union 12-3 Bone and Potash.....	12	..	3
Union 12-4 Bone and Potash.....	12	..	4
Union 12-5 Bone and Potash.....	12	..	5
Union 12-6 Bone and Potash.....	12	..	6
Union 16 Per Cent Acid Phosphate.....	16	..	..
Union High Grade Acid Phosphate.....	14	..	..
Union Dissolved Bone.....	13	..	..
Union 12 Per Cent Acid Phosphate.....	12	..	..
Union 10 Per Cent Acid Phosphate.....	10	..	..
Giant Phosphate and Potash.....	10	..	3
Sunrise Soluble Bone and Potash.....	8	..	2.25
Liberty Bell Crop Grower	10	..	1.50
Rockingham Bone and Potash.....	8.50	..	2
Roseboro's Special Potash Mixture.....	12	..	6
Old Honesty Guano.....	8	2	2
Victoria High Grade Tobacco Guano.....	8	3	3
Vulcan Ammoniated Guano.....	8	2.50	1
Quaker Grain Mixture.....	10	..	4
Q. and Q. (Quantity and Quality) Guano.....	8	2	1
Genuine German Kainit.....	..	..	12
Murray's Potash Mixture.....	8	..	2.25
Murray's Special Crop Grower.....	8	2	2
Cotton-seed Meal .....	..	7.50	..
Union Special Formula for Cotton.....	10	3	3
Union Complete Cotton Mixture.....	9	2	3

Name and Address of Manufacturer and Name of Brand.	Avail Phos. Acid.	Am- monia.	Potash.
<i>Venable Fertilizer Co., Richmond, Va.—</i>			
Venable's 10 Per Cent Trucker.....	6	10	2
Venable's 6-6-6 Manure.....	6	6	6
Venable's 5 Per Cent Trucker.....	8	5	5
Venable's 4 Per Cent Trucker.....	8	4	4
Venable's Ideal Manure.....	8	2	5
Venable's Roanoke Special.....	8	2.50	3
Venable's Dissolved Bone Phosphate.....	13	..	..
Venable's S. C. Bone.....	10	..	..
Venable's B. B. P. Manure.....	8	2	1
Venable's Alliance Bone and Potash Mixture.....	8	..	4
Venable's Peanut Grower.....	8	..	4
Venable's Grain and Grass Grower.....	8	..	2
Venable's Alliance Acid Phosphate.....	14	..	..
Planters' Bone Fertilizer.....	8	2	2
Bone and Potash Mixture.....	10	..	2
High Grade Bone and Potash Mixture.....	10	..	4
Pure Raw Bone Meal..... (Total)	20	4	..
Bone Meal (Total)	25	3	..
Pure German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
Nitrate of Soda.....	..	19	..
Venable's Cotton Grower.....	8	2.50	3
Venable's Roanoke Mixture.....	9	2.75	2

Virginia-Carolina Chemical Co., Richmond, Va.—

V. C. C. Co.'s Solid South.....	8	..	2.25
V. C. C. Co.'s 14 Per Cent Acid Phosphate.....	14	..	..
V. C. C. Co.'s 16 Per Cent Acid Phosphate.....	16	..	..
V. C. C. Co.'s Standard Bone and Potash.....	10	..	5
V. C. C. Co.'s Special Crop Grower.....	12	..	3
V. C. C. Co.'s Formula 44.....	7	3.10	3.20
V. C. C. Co.'s Special Truck Guano.....	6	5	7
V. C. C. Co.'s Special.....	8	4	4
V. C. C. Co.'s Special Potash Mixture.....	10	..	4
V. C. C. Co.'s High Grade Tobacco Fertilizer.....	8	3	10
V. C. C. Co.'s Invincible High Grade Fertilizer.....	6	5	7
V. C. C. Co.'s Lion High Grade Tobacco Fertilizer..	8	3	4
V. C. C. Co.'s Great Texas Cotton Grower Soluble Guano	9	3	4
Cock's Soluble High Grade Animal Bone.....	9	2.25	3
Truck Crop Fertilizer.....	7	5	7
Cotton Grower	9	2.75	2
Battle's Crop Grower.....	12	..	3
3 Per Cent Special C. S. M. Guano No. 3.....	8	3	2
Sludge Acid Phosphate.....	14	..	..
Delta C. S. M.....	8	2.75	2.50
Winston Special for Cotton C. S. M.....	8	2	2
Diamond Dust C. S. M.....	8	2	2
Admiral	8	3	2.50
Blue Star C. S. M.....	8	2.50	3
Good Luck C. S. M.....	8	3	2.50
North State Guano C. S. M.....	8	2	1
Plant Food	8	2	2
Prolife Cotton Grower C. S. M.....	9	2.75	2
Split Silk C. S. M.....	8	3	2.50
Superlative Guano C. S. M.....	8	2.50	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Farmers' Friend Favorite Fertilizer Special.....	8.50	2	2
White Stem C. S. M.....	9	2.75	2
Special High Grade Tobacco Fertilizer C. S. M.....	8	3	3
Wilson Standard C. S. M.....	8	2	2
Adams' Special	8	3	3
Ajax C. S. M.....	8	2	2
Royal Crown	8	2.75	2
Farmers' Favorite Fertilizer C. S. M.....	8	2	2
Atlas Guano C. S. M.....	8	3	2.50
Blake's Best	8	3	3
Orange Grove	8	2.75	2.50
Genuine German Kainit.....	..	..	12
Cotton-seed Meal .....	..	7.50	..
Nitrate of Soda.....	..	19	..
Fish Scrap .....	..	10	..
Raw Bone Meal..... (Total)	20	4	..
Sulphate of Ammonia.....	..	25	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Manure Salts .....	..	..	50
Carr's 8-4-4 Crop Grower.....	8	4	4
Allison & Addison's Rockett's Acid Phosphate.....	10	..	..
Allison & Addison's Standard Acid Phosphate.....	12	..	..
Allison & Addison's I. X. L. Acid Phosphate.....	13	..	..
Allison & Addison's Fulton Acid Phosphate.....	14	..	2.25
Allison & Addison's McGavock's Spl. Potash Mixture,	8	..	..
Allison & Addison's B. P. Potash Mixture.....	10	..	2
Allison & Addison's Old Hickory Guano.....	8	2	2
Allison & Addison's A A.....	8	3	3
Allison & Addison's Anchor Brand Fertilizer.....	8	2	2
Allison & Addison's Anchor Brand Tobacco Fertilizer,	8.50	2.75	2
Allison & Addison's Star Brand Spl. Tobacco Manure	9	2.75	2
Allison & Addison's Star Brand Guano.....	8	2	1
Allison & Addison's Star Brand Vegetable Guano...	8	4.50	4
Atlantic & Va. Fert. Co.'s Our Acid Phosphate....	12	..	..
Atlantic & Va. Fert. Co.'s Valley of Va. Phosphate..	14	..	..
Atlantic & Va. Fert. Co.'s Eureka Acid Phosphate..	10	..	..
Atlantic & Va. Fert. Co.'s Crenshaw's Acid Phos- phate	13	..	..
Atlantic & Va. Fert. Co.'s Eureka Bone and Potash Compound	10	..	2
Atlantic & Va. Fert. Co.'s Carolina Truckers'.....	7	7	7
Atlantic & Va. Fert. Co.'s Orient Spl. for Tobacco...	8	2	2
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone,	8	2	2
Atlantic & Va. Fert. Co.'s Virginia Truckers'.....	8	5	5
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9	2.50	2
Atlantic & Va. Fert. Co.'s Orient Complete Manure..	8	2	1
Charlotte Oil & Fert. Co.'s Catawba Acid Phosphate,	10	..	..
Charlotte Oil & Fert. Co.'s Charlotte Dissolved Bone,	12	..	..
Charlotte Oil & Fert. Co.'s Charlotte 15 Per Cent Acid Phosphate	15	..	..
Charlotte Oil & Fert. Co.'s Charlotte Acid Phosphate,	13	..	..
Charlotte Oil & Fert. Co.'s Charlotte Ten-Two Bone and Potash	10	..	2
Charlotte Oil & Fert. Co.'s Oliver's Perfect Wheat Grower	11	3	4
Charlotte Oil & Fert. Co.'s McCrary's Diamond Bone and Potash	8	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Charlotte Oil & Fert. Co.'s Catawba Guano B. G....	8	2	1
Charlotte Oil & Fert. Co.'s Queen of the Harvest C. S. M.....	8	2	1
Charlotte Oil & Fert. Co.'s Special 3 Per Cent Guano C. S. M.....	8	3	2
Charlotte Oil & Fert. Co.'s High Grade Special Tobacco Fertilizer	9	2.50	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Bone B. G.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Groom's Special Tobacco Fertilizer	8	3	3
Charlotte Oil & Fert. Co.'s King Cotton Grower.....	8	2	2
Charlotte Oil & Fert. Co.'s The Leader B. G.....	8	2	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano B. G.....	8	2.50	1.50
Davie & Whittle's Owl Brand Dissolved Bone.....	12	..	..
Davie & Whittle's Owl Brand Acid Phosphate.....	10	..	..
Davie & Whittle's Owl Brand H. G. Acid Phosphate,	13	..	..
Davie & Whittle's Owl Brand H. G. Dissolved Bone..	14	..	..
Davie & Whittle's Owl Brand Acid Phosphate with Potash	10	..	2
Davie & Whittle's Owl Brand Guano.....	8	2	2
Davie & Whittle's Owl Brand Guano No. 2.....	8	2	1
Davie & Whittle's Owl Brand Truck Guano.....	8	6	5
Davie & Whittle's Owl Brand Special Tobacco Guano,	9	2.50	2
Davie & Whittle's Owl Brand Guano for Tobacco...	8	3	3
Davie & Whittle's Owl Brand Vinco Guano.....	8	2	1
Durham Fert. Co.'s Durham Acid Phosphate.....	10	..	..
Durham Fert. Co.'s Durham H. G. Acid Phosphate..	13	..	..
Durham Fert. Co.'s Durham Bone and Potash Mix- ture	10	..	2
Durham Fert. Co.'s Durham Ammoniated Fertilizer,	8	2	1
Durham Fert. Co.'s N. C. Farmers' Alliance Official Acid Phosphate	13	..	..
Durham Fert. Co.'s Blacksburg Dissolved Bone.....	13	..	..
Durham Fert. Co.'s Raw Bone Superphosphate for Tobacco	8	2.50	2
Durham Fert. Co.'s Genuine Bone and Peruvian Guano for Tobacco.....	8	2	2
Durham Fert. Co.'s Raw Bone Superphosphate....	8	2.50	1.50
Durham Fert. Co.'s Gold Medal Brand Guano.....	8	3	3
Durham Fert. Co.'s Genuine Bone and Peruvian Guano	8	2	2
Durham Fert. Co.'s N. C. Farmers' Alliance Official Guano	8	2.50	3
Durham Fert. Co.'s Golden Leaf Bright Tobacco Guano	8	3	3
Durham Fert. Co.'s Spl. Plant and Truck Fertilizer.	8	5	3
Durham Fert. Co.'s Progressive Farmer Guano.....	8	2	1
Durham Fert. Co.'s L. & N. Special.....	9	3	2
Durham Fert. Co.'s Best Potato Manure.....	7	7	7
Durham Fert. Co.'s Blacksburg Soluble Guano.....	8	2	2
Durham Fert. Co.'s Standard Guano.....	9	2	2
Durham Fert. Co.'s Great Wheat and Corn Grower..	10	..	1.50
Durham Fert. Co.'s Carr's Special Wheat Grower..	8	..	4
Durham Fert. Co.'s Standard Wheat Grower.....	10	..	2
Durham Fert. Co.'s Blue Ridge Wheat Grower.....	10	..	2
Durham Fert. Co.'s Diamond Wheat Mixture.....	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Durham Fert. Co.'s Double Bone Phosphate.....	13	..	..
Durham Fert. Co.'s Excelsior Dis. Bone Phosphate..	14	..	..
Durham Fert. Co.'s Standard High Grade Phosphate,	13	..	..
Lynchburg Guano Co.'s Golden Age Pure Bone			
Meal	20	4	..
(Total)			
Lynchburg Guano Co.'s Ironside Acid Phosphate....	16	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate....	12	..	..
Lynchburg Guano Co.'s Otter Brand Acid Phosphate,	10	..	..
Lynchburg Guano Co.'s Arvonian Acid Phosphate....	13	..	..
Lynchburg Guano Co.'s Lynchburg High Grade Acid			
Phosphate	14	..	..
Lynchburg Guano Co.'s S. W. Special Bone and			
Potash Mixture	10	..	4
Lynchburg Guano Co.'s Alpine Mixture.....	10	..	5
Lynchburg Guano Co.'s Dissolved Bone and Potash..	10	..	2
Lynchburg Guano Co.'s Lynchburg Soluble for			
Tobacco	8	2	2
Lynchburg Guano Co.'s Lynchburg Soluble.....	8	2	2
Lynchburg Guano Co.'s New Era.....	8	2	1
Lynchburg Guano Co.'s Independent Standard.....	8.50	2	2
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8	2.75	4
Lynchburg Guano Co.'s Bright Belt Guano.....	8	2	..
Norfolk & Car. Chem. Co.'s Norfolk Reliable Acid			
Phosphate	10	..	..
Norfolk & Car. Chem. Co.'s Norfolk Best Acid Phos-			
phate	13	..	..
Norfolk & Car. Chem. Co.'s Norfolk Bone and Potash,	10	..	2
Norfolk & Car. Chem. Co.'s Creseent Brand Ammon-			
iated Fertilizer	8	2	1
Norfolk & Car. Chem. Co.'s Cooper's Bright Tobacco			
Fertilizer	8	2.50	3
Norfolk & Car. Chem. Co.'s Norfolk Truck and			
Tomato Grower	8	5	5
Norfolk & Car. Chem. Co.'s Pretlow's Champion			
for Peanuts, Cotton and Corn.....	8	2	1
Norfolk & Car. Chem. Co.'s Genuine Slaughter			
House Bone	8	2	2
Norfolk & Car. Chem. Co.'s Bright Leaf Tobacco			
Grower	8	3	3
Norfolk & Car. Chem. Co.'s Genuine Slaughter			
House Bone made especially for Tobacco.....	8	2.50	2
Norfolk & Car. Chem. Co.'s Amazon H. G. Manure..	8	3	3
Norfolk & Car. Chem. Co.'s Norfolk Soluble Bone...	10	..	..
Old Dominion Guano Co.'s H. G. Bone Phosphate..	13	..	..
Old Dominion Guano Co.'s Royster's High Grade			
Acid Phosphate	12	..	..
Old Dominion Guano Co.'s Planters' Bone and			
Potash Mixture	10	..	3
Old Dominion Guano Co.'s Miller's Special Wheat			
Mixture	8	..	4
Old Dominion Guano Co.'s High Grade Alkaline			
Bone and Potash.....	10	..	2
Old Dominion Guano Co.'s Dis. Bone and Potash....	8.50	..	2
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck			
Guano	6	7	5
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck			
Guano	7	7	7

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Old Dominion Guano Co.'s Isley's Formula of Dis- solved Bone Potash Chemicals.....	8	3	3
Old Dominion Guano Co.'s Bullock's Cotton Grower.	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6	2	2
Old Dominion Guano Co.'s Osceola Tobacco Guano..	8	2.50	3
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Soluble Guano	8	2	2
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer	8	3	3
Old Dominion Guano Co.'s Farmers' Friend Fer- tilizer	8	2	2
Old Dominion Guano Co.'s Standard Raw Bone Solu- ble Guano	8	2	1
Old Dominion Guano Co.'s Old Dominion Potato Manure	7	5	8
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer	8	3	3
Powers, Gibbs & Co.'s Fulp's H. G. Acid Phosphate..	13	..	..
Powers, Gibbs & Co.'s Cotton Brand Acid Phosphate.	12	..	..
Powers, Gibbs & Co.'s Almont H. G. Acid Phosphate.	13	..	..
Powers, Gibbs & Co.'s Almont Wheat Mixture.....	10	..	3
Powers, Gibbs & Co.'s Cotton Brand H. G. Acid Phosphate	13	..	..
Powers, Gibbs & Co.'s Acid Phosphate and Potash..	10	..	1
Powers, Gibbs & Co.'s Dissolved Bone and Potash...	10	..	2
Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano	8	3	2
Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone	8	2	1
Powers, Gibbs & Co.'s Almont Soluble Ammoniated Guano	8	2	2
Powers, Gibbs & Co.'s Carolina Golden Belt Ammo- niated Guano for Tobacco.....	8	2.50	3
Powers, Gibbs & Co.'s Eagle Island Ammo'd Guano..	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano.....	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano	9	3	2
Powers, Gibbs & Co.'s Truck Farmers' Special Am- moniated Guano	8	4	5
Powers, Gibbs & Co.'s Old Kentucky H. G. Manure..	8	3	3
Powers, Gibbs & Co.'s Gibbs' H. G. Ammo'd Guano..	8	2.50	1
Powers' H. G. Ammoniated Guano.....	8	2.50	2
Southern Chem. Co.'s Tar Heel Acid Phosphate....	12	..	..
Southern Chem. Co.'s Horseshoe Acid Phosphate...	10	..	..
Southern Chem. Co.'s Elkin Acid Phosphate.....	12	..	..
Southern Chem. Co.'s Chatham Acid Phosphate....	13	..	..
Southern Chem. Co.'s Click's 16 Per Cent Acid Phosphate	16	..	..
Southern Chem. Co.'s Victor H. G. Acid Phosphate..	16	..	..
Southern Chem. Co.'s Comet 16 Per Cent Acid Phosphate	16	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Southern Chem. Co.'s Red Cross 14 Per Cent Acid Phosphate	14	..	..
Southern Chem. Co.'s Reaper Grain Application....	12	..	3
Southern Chem. Co.'s Farmers' Pride Bone and Potash	10	..	3
Southern Chem. Co.'s Quickstep Bone and Potash...	10	..	1
Southern Chem. Co.'s Mammoth Corn Grower.....	10	..	2
Southern Chem. Co.'s Winner Grain Mixture.....	10	..	4
Southern Chem. Co.'s Winston Bone and Potash Compound	10	..	2
Southern Chem. Co.'s Mammoth Wheat and Grass Grower	10	..	2
Southern Chem. Co.'s Sun Brand Guano.....	9	2.50	5
Southern Chem. Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8	3	2.50
Southern Chem. Co.'s Yadkin Complete Fertilizer...	8	2	1
Southern Chem. Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8	2.50	3
Southern Chem. Co.'s Electric Standard Guano.....	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano.....	8	2	2
Southern Chem. Co.'s Click's Spl. Wheat Compound,	8	..	4
J. G. Tinsley & Co.'s Stonewall Brand Acid Phos...	10	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate....	14	..	..
J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	13	..	..
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture	10	..	2
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower..	6	4	4
J. G. Tinsley & Co.'s Stonewall Guano.....	8	2	2
J. G. Tinsley & Co.'s Lee Brand Guano.....	8	2	2
J. G. Tinsley & Co.'s 10 Per Cent Truck Guano....	5	10	2.50
J. G. Tinsley & Co.'s Stonewall Tobacco Guano.....	8	2	2
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer...	8	4	2.50
J. G. Tinsley & Co.'s Irish Potato Guano.....	6	6	6
J. G. Tinsley & Co.'s Richmond Brand Guano.....	8	2	1
J. G. Tinsley & Co.'s Killikinnick Tobacco Mixture..	8	2.50	3
J. G. Tinsley & Co.'s Champion Acid Phosphate.....	10	..	..
S. W. Travers & Co.'s Capital Dissolved Bone.....	12	..	..
S. W. Travers & Co.'s Standard Dissolved S. C. Bone.	13	..	..
S. W. Travers & Co.'s Dissolved Bone Phosphate....	14	..	..
S. W. Travers & Co.'s Special Wheat Compound....	8	..	4
S. W. Travers & Co.'s Capital Bone and Potash Compound.....	10	..	2
S. W. Travers & Co.'s Beef Blood and Bone Fertilizer,	8	2	1
S. W. Travers & Co.'s Capital Cotton Fertilizer.....	8	2.50	1
S. W. Travers & Co.'s Capital Truck Fertilizer....	8	4	3
S. W. Travers & Co.'s Capital Tobacco Fertilizer....	8	4	3
S. W. Travers & Co.'s National Special Tobacco Fertilizer.....	8	2	2
S. W. Travers & Co.'s National Fertilizer.....	8	2	2
Va. State Fert. Co.'s Gilt Edge Brand Pure Bone Meal.....(Total)	20	4	..
Va. State Fert. Co.'s Lurish Acid Phosphate.....	10	..	..
Va. State Fert. Co.'s Alps Brand Acid Phosphate....	12	..	..
Va. State Fert. Co.'s Clipper Brand Acid Phosphate,	13	..	..
Va. State Fert. Co.'s Bull Run Acid Phosphate.....	16	..	..
Va. State Fert. Co.'s Gilt Edge Brand Acid Phosphate.....	14	..	..
Va. State Fert. Co.'s Gilt Edge Brand Dissolved Bone and Potash	8.50	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Va. State Fert. Co.'s High Grade Dissolved Bone and Potash.....	10	..	2
Va. State Fert. Co.'s Mountain Top Bone and Potash	10	..	5
Va. State Fert. Co.'s XX Potash Mixture.....	10	..	5
Va. State Fert. Co.'s Bull Dog Soluble Guano.....	8	3	3
Va. State Fert. Co.'s G. E. Special Tobacco Grower..	8	2.50	2
Va. State Fert. Co.'s Game Cock Special Tobacco....	8.50	2	2
Va. State Fert. Co.'s Battle Axe Tobacco Guano....	8	2	2
Va. State Fert. Co.'s Highland King.....	8	2	1
Va. State Fert. Co.'s No. 1 Soluble Guano.....	9	2	..
Va. State Fert. Co.'s Dunnington's Special Formula for Tobacco	8	3	3
Va. State Fert. Co.'s Austrian Tobacco Grower....	8	2.50	2
Va. State Fert. Co.'s Va. State High Grade Tobacco Guano.....	8	2	2
Va. State Fert. Co.'s Buffalo Guano.....	8	2.50	3
Va. State Fert. Co.'s Va. State High Grade Guano..	8	2	2
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Ammoniated Guano for Beans, Peas, Cabbage, Strawberries, etc.	6	7	6
S. W. Travers & Co.'s Travers' 7 Per Cent Truck Fertilizer. J.....	6	7	5
J. G. Tinsley's Special Irish Potato Guano.....	6	7	6
Durham Fert. Co.'s Standard Wheat and Corn Grower	10	..	2
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Bone Meal.....	15.85	4.60	..
<i>Williams & Clark Fertilizer Works, New York, and Charleston, S. C.—</i>			
Americus Ammoniated Bone Superphosphate.....	8	2.25	1
<i>Winborne Guano Co., Tynes, N. C.—</i>			
Winborne 7 Per Cent Guano.....	5	7	5
Winborne 3-8-4 Guano.....	8	3	4
King's Tammany Guano.....	8	2.50	3
Farmers' Select Guano	8	2.50	3
High Grade Excelsior Guano.....	8	2	2
High Grade Eureka Guano	8	2	2
High Grade Triumph Guano	8	2	2
Soluble Bone and Potash	10	..	2
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit .....	..	..	12
Winborne's Tobacco Guano	8	3	3
Standard 16 Per Cent Acid Phosphate.....	16	..	..
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Standard Vegetable Fertilizer	8	3	3
Standard Potato Fertilizer.....	8	2	5
Standard Grain and Grass Grower	8	2	2
Standard High Grade Acid Phosphate.....	14	..	..
Standard Bone and Potash Mixture.....	10	..	2
Lawn Enricher	5	3	3
Wood's Pure Animal Bone	(Total) 23	3	..
Nitrate of Soda .....	..	19	..
Standard Corn Fertilizer	8	2	1
<i>Wilson & Toomer Fertilizer Co., Jacksonville, Fla.—</i>			
Davis' Truck Grower Special.....	6	5	5

I. ANALYSES OF FERTILIZERS—SPRING SEASON, 1907.
II. REGISTRATION OF FERTILIZERS.



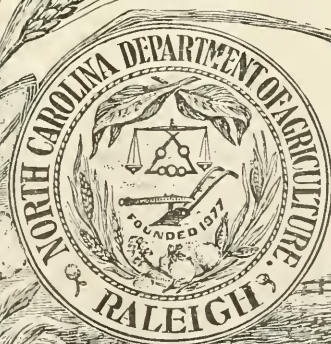
THE BULLETIN

OF THE
NORTH CAROLINA

STATE BOARD OF

AGRICULTURE

Raleigh



APRIL, 1907.

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION.

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THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 4.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, APRIL, 1907.

I.—FERTILIZER ANALYSES—SPRING SEASON, 1907.

BY B. W. KILGORE, STATE CHEMIST.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the spring of 1907. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by, or before, the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in a condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is

thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analysis will help him to do this.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and

potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the costs of fertilizing materials are liable to change as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1906.

In Unmixed or Raw Materials.

Phosphoric acid in acid phosphate.....	4	cents per pound.
Phosphoric acid in bone meal.....	3½	cents per pound.
Ammonia	14½	cents per pound.
Potash	5	cents per pound.

In Mixed Fertilizers.

Phosphoric acid	4½	cents per pound.
Ammonia	16½	cents per pound.
Potash	5½	cents per pound.

The valuations decided on this season, for the reasons already given, are:

VALUATIONS FOR 1907.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano	3½	cents per pound.
For ammonia	15½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid	4½ cents per pound.
For ammonia	16½ cents per pound.
For potash	5½ cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—2 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and ammonia 2 per cent, the calculation is made as follows:

Percentage or Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton 2,000 Lbs.
8 pounds available phosphoric acid at 4½ cents -----	$0.36 \times 20 =$	\$7.20
2 pounds potash at 5½ cents -----	$0.11 \times 20 =$	2.20
2 pounds ammonia at 16½ cents -----	$0.33 \times 20 =$	6.60
Total value -----	$0.80 \times 20 =$	\$16.00

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance	\$3.20	\$3.20	\$3.40	\$3.20
Apex	2.70		3.80	3.00
Ashboro	3.20	3.20	3.60	3.20
Asheville	4.00	4.00	4.00	4.60
Chapel Hill	2.95	3.20	3.90	3.20
Charlotte	2.65	3.20	2.85	3.20
Clayton	2.48	2.86	3.63	2.83
Cherryville	3.85	3.60	3.40	3.60
Clinton	1.60	3.00	3.20	3.00
Creedmoor	3.00	3.00	3.80	3.00
Cunningham	3.00	2.40	4.00	2.40
Dallas	3.00	3.60	3.40	3.60
Davidson College	3.00	3.20	2.20	3.20
Dudley	1.70	3.00	3.20	3.00
Dunn	2.00	2.80	3.20	2.80
Durham	2.80	2.83	3.20	2.83
Elkin	3.60	3.20	3.60	3.20
Elm City	2.10	2.60	3.20	2.60
Fair Bluff	1.60	3.80	2.40	3.80
Fayetteville	1.80	3.00	3.00	3.00
Forestville	2.85	3.00	3.80	3.06
Gastonia	3.12	3.25	3.12	3.25
Gibson	2.10	3.50	2.10	3.50
Goldsboro	1.80	2.80	3.20	2.80
Greensboro	2.96	3.00	3.40	3.00
Hamlet	2.00	3.00	3.60	3.00
Henderson	3.00	2.83	3.55	2.83
Hickory	3.20	3.60	3.20	3.60
High Point	3.00	3.08	3.40	3.08
Hillsboro	2.88	2.88	2.68	2.88
Kernersville	3.00	3.00	3.40	3.00
Kinston	2.10	2.80	3.50	2.80
Laurel Hill	1.90	2.40	3.80	3.40
Laurinburg	1.90	3.40	3.80	3.40
Liberty	2.72	3.60	3.80	3.60
Louisburg	2.95	3.00	3.80	3.00
Lumberton	1.60	3.60	3.70	3.60
Macon	3.05	3.00	3.85	3.00
Madison	3.00	3.00	3.40	3.00
Matthews	2.60	3.20	3.20	3.20
Maxton	1.80	3.40	2.70	3.40
Milton	3.44	2.40	4.00	2.40
Mocksville	3.36	3.20	3.40	3.20
Morven	2.55	3.60	2.50	3.60
Mount Airy	2.20	3.40	3.80	3.40
Nashville	2.30	2.90	3.40	2.90
New Bern	1.25	1.75	3.95	1.75
Norwood	3.68	3.20	3.20	2.23
Oxford	3.04	2.83	3.55	2.83
Pineville	2.77	3.25	3.00	3.20
Pittsboro	2.60	3.30	4.10	3.30
Polkton	2.40	3.00	2.20	3.00
Raleigh	2.56	2.83	3.40	2.83
Reidsville	3.00	2.96	3.40	2.36
Rockingham	2.10	3.00	3.80	3.00
Rocky Mount	2.20	2.50	3.40	2.50
Ruffin	3.28	2.80	3.40	2.20
Rural Hall	3.28	3.20	3.60	3.20
Rutherfordton	3.05	3.65	3.05	3.65
Salisbury	3.25	3.20	3.20	3.20
Sanford	2.10	3.00	3.40	3.00
Selma	2.10	2.80	3.20	2.80
Shelby	2.90	3.60	3.90	3.60
Siler City	2.60	3.60	3.80	3.60
Smithfield	2.20	2.80	3.20	2.80
Statesville	3.50	3.20	3.60	3.20
Stem	2.95	2.83	3.80	2.83
Tarboro	2.30	2.40	3.00	2.40
Waco	2.90	3.60	3.40	3.60
Wadesboro	2.30	3.00	2.50	3.00
Walnut Cove	3.00	3.00	3.40	3.00
Warrenton	3.05	3.25	4.10	3.25
Warsaw	1.50	3.00	3.20	3.00
Washington	2.65	1.75	2.25	1.50
Weldon	2.55	1.90	3.85	1.90
Wilson	2.00	2.60	3.20	2.60
Winston-Salem	3.00	3.00	3.40	3.00

5564	Baugh & Sons Co., Norfolk, Va.-----	Baugh's Grand Rapid Truck Guano.	Washington---	D	7.25	1.62	8.87	.72	2.62	3.34	3.00	22.30
5568	Bragaw, Wm. & Co., Washington, N. C.	Beaufort County Guano.	do-----	R	6.45	1.64	8.09	2.02	1.12	3.14	3.21	21.17
5621	Imperial Company, Norfolk, Va.-----	Imperial, X. L. O., Cotton Guano	do-----	R	6.60	1.50	8.10	1.78	1.36	3.14	3.38	21.37
5619	Pocomoke Guano Co., Norfolk, Va.-----	Monarch Tobacco Grower	do-----	R	6.20	1.81	8.01	1.56	1.54	3.10	3.12	20.87
5581	Richmond Guano Co., Richmond, Va.-----	Gilt Edge Fertilizer	Edenton---	S	4.33	3.53	7.86	1.76	1.06	3.12	3.58	20.31
5586	Va.-Car. Chemical Co., Richmond, Va.-----	Durham Fertilizer Co.'s Gold Metal Brand.	do-----	D	7.20	1.14	8.34	1.52	1.72	3.24	3.17	21.68
5645	-----do-----	Old Dominion Farmers Friend High Grade Fertilizer.	Washington---	R	6.38	1.58	7.96	1.58	1.62	3.20	3.09	21.12
5582	Winborne Guano Co., Tyner, N. C.-----	Winborne's Tobacco Guano.	Edenton---	R	7.03	1.39	8.42	1.30	2.50	3.80	2.95	23.36
5597	Piedmont Guano Co., Baltimore, Md.-----	Privott's 3-3-4 Guano.	Edenton---	S	7.20	1.64	8.84	2.26	.84	3.10	3.42	21.94
5601	Va.-Car. Chemical Co., Richmond, Va.-----	Powers, Gibbs & Co.'s Truck Farmers Special Ammoniated Guano.	Elizabeth City---	R	7.48	1.46	8.94	2.68	1.82	4.00	5.00	25.90
5604	Brand claiming-----	Atlantic and Virginia Fertilizer Co.'s Virginia Trucker.	Elizabeth City---	R	6.38	1.92	8.30	3.12	2.30	5.00	5.00	29.20
5574	Brands claiming-----	Imperial Martin County Special Crop Grower	Williamston---	D	8.93	1.00	9.93	1.42	1.30	2.75	2.00	19.37
5605	Va.-Car. Chemical Co., Richmond, Va.-----	Prolific Cotton Grower	Edenton---	N	8.40	.66	9.06	.54	2.12	2.66	2.96	20.18
5599	American Fertilizer Co., Norfolk, Va.-----	Strawberry Guano	Edenton---	S	7.65	1.39	9.04	2.72	1.44	4.16	7.93	30.58
5584	Patapsco Guano Co., Baltimore, Md.-----	Patapsco Guano	Edenton---	S	6.65	2.40	9.05	.90	1.86	2.76	2.00	19.45
5585	Upshur, R. L., Norfolk, Va.-----	Upshur's 5 Per Cent Guano	Edenton---	R	6.20	.93	7.27	3.22	2.32	5.54	4.16	26.50
5622	Imperial Company, Norfolk, Va.-----	Imperial Special 7 Per Cent for Potatoes and Early Truck.	Edenton---	R	4.55	1.71	6.26	4.16	3.36	7.00	5.00	33.10
5627	Winborne Guano Co., Tyner, N. C.-----	Winborne's 7 Per Cent Guano	Washington---	R	5.13	1.59	6.72	3.90	3.18	7.08	4.96	34.86
5571	Baugh & Sons Co., Norfolk, Va.-----	Baugh's 5-6-5 Guano	Edenton---	R	4.90	1.77	6.67	3.36	1.90	5.00	5.00	27.40
5588	American Fertilizer Co., Norfolk, Va.-----	Special Potato Manure	Elizabeth City---	D	6.08	.99	7.07	2.98	2.52	5.26	5.16	29.08
5576	Piedmont-Mt. Airy Guano Co., Baltimore, Md.-----	Piedmont Early Vegetable Manure.	Edenton---	R	5.08	1.14	6.22	2.43	2.08	5.50	5.36	30.41
5609	Brands claiming-----	Lazaretto Farmers Favorite for Producing Quick Growth.	Washington---	R	5.40	1.74	7.14	4.64	2.22	7.00	5.00	34.00
5572	New York, N. Y.-----	Baugh & Sons Co., Norfolk, Va.-----	Elizabeth City---	R	5.15	1.55	6.70	4.46	2.74	7.20	5.22	35.53
5596	Piedmont-Mt. Airy Guano Co., Baltimore, Md.-----	Piedmont Special Truck Fertilizer.	Edenton---	P	4.78	1.34	6.12	4.56	2.06	6.62	5.02	32.87
5577	Va.-Car. Chemical Co., Richmond, Va.-----	Old Dominion 6-7-5 Truck Guano.	Washington---	R	4.80	1.16	5.96	2.96	3.86	6.82	4.74	34.06

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

5634	Brand claiming Baugh & Sons Co., Norfolk, Va.	Baugh's 16 Per Cent Acid Phosphate.	Edenton	R	15.13	1.49	16.00	12.80 13.29
Brands claiming								
5639	American Fertilizer Co., Norfolk, Va.	Genuine German Kainit.	Elizabeth City	R			12.00	12.00
5662	Baugh & Sons Co., Norfolk, Va.	do	Edenton	S			12.40	12.40
5700	Best & Thompson, Goldsboro, N. C.	do	Goldsboro	R			12.82	12.82
5724	Calder Bros., Wilmington, N. C.	do	Whiteville	S			12.58	12.58
5615	Hubbard Fertilizer Co., Baltimore, Md.	do	Washington	S			12.96	12.96
5603	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	do	Edenton	S			13.92	13.92
	more, Md.	do		S			12.58	12.58
5626	Pocomoke Guano Co., Norfolk, Va.	do	Washington	S			12.96	12.96
5687	Royster, F. S., Guano Co., Norfolk, Va.	do	New Bern	S			12.44	12.44
5625	Va.-Car. Chemical Co., Richmond, Va.	do	Greenville	S			12.20	12.20
5590	Winborne Guano Co., Tyner, N. C.	do	Edenton	R			12.78	12.78
Brand claiming								
5640	Lee, A. S., & Sons Co., Richmond, Va.	Lee's Agricultural Lime	Edenton	R			2.00	2.00
							2.16	2.16

N, D, P, S, E, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

II. FERTILIZER BRANDS REGISTERED FOR 1907.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Geo. L. Arps & Co., Norfolk, Va.—</i>			
Geo. L. Arps & Co.'s Big Yield Guano.....	8	2	2
14 Per Cent Acid Phosphate.....	14	..	..
High Grade Premium Guano.....	8	2	2
Kainit .....	..	..	12
Arps' Potato Guano.....	6	7	5
Arps' Standard Truck Guano.....	7	5	5
Arps' Scuppernong Guano for Truck.....	6	5	7
<i>Alabama Cotton Oil Co., Huntsville, Ala.—</i>			
Cotton-seed Meal.....	..	7.50	..
<i>Atlantic Chemical Co., Norfolk, Va.—</i>			
Atlantic 7 Per Cent Truck Guano.....	7	7	7
Atlantic Potato Guano.....	7	5	5
Atlantic Special Truck Guano.....	8	4	4
Atlantic High Grade Cotton Guano.....	8	3	3
Atlantic High Grade Tobacco Guano.....	8	3	3
Atlantic Meal Compound	9	2.75	2
Atlantic Tobacco Grower.....	8	2.50	3
Atlantic Tobacco Compound.....	8	2.50	2
Atlantic Soluble Guano.....	8	2	2
Atlantic Special Wheat Fertilizer.....	8	2	2
Atlantic Cotton Grower.....	8	2.50	1
Atlantic Special Guano.....	8	2	1
Atlantic 8 and 2 Bone and Potash Mixture.....	8	..	2
Atlantic 8 and 4 Bone and Potash Mixture.....	8	..	4
Atlantic Bone and Potash Mixture.....	10	..	2
Atlantic Bone and Potash for Grain.....	10	..	3
Atlantic 10 and 4 Bone and Potash Mixture.....	10	..	4
Atlantic Acid Phosphate.....	12	..	..
Atlantic High Grade Dissolved Bone.....	13	..	5
Atlantic 14 Per Cent Acid Phosphate.....	14	..	..
Atlantic High Grade 16 Per Cent Acid Phosphate..	16	..	..
Oriental High Grade Guano.....	8	4	4
Perfection Peanut Grower.....	7	..	5
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
Cotton-seed Meal .....	..	7.50	..
<i>The Armour Fertilizer Works, Baltimore, Md.—</i>			
12 Per Cent Acid Phosphate.....	12	..	..
13 Per Cent Acid Phosphate.....	13	..	..
Star Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Phosphate and Potash No. 1.....	10	..	2
Phosphate and Potash No. 2.....	8	..	5
Wheat Grower	10	..	4
Phosphoric Acid and Potash.....	10	..	5
Top Dresser	5	10	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
10 Per Cent Trucker.....	5	10	3
Ammoniated Bone with Potash.....	6	3	2
Manure Substitute	6	4	4
7 Per Cent Trucker.....	6	7	5
General	8	2	2
Fruit and Root Crop Special.....	8	2	5
High Grade Potato.....	8	2	10
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Cotton Special	8	3	3
Tobacco Special	8	3	3
Truck and Berry Special.....	8	3	10
All Soluble	8	3.50	4
Special Trucker	8	4	4
Bone, Blood and Potash.....	8	5	7
Bone and Dissolved Bone with Potash.....	9	2	3
African Cotton Grower.....	9	3	3
10 Per Cent Tankage.....	..	10	..
M. H. White & Co.'s Special Corn Mixture.....	10	..	2
Bone Meal	24	3	..
Acidulated Bone Meal	18	2	..
Raw Bone Meal	22	4.50	..
German Kainit .....	..	..	12
16 Per Cent Kainit.....	..	..	16
Dried Blood .....	..	16	..
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Superphosphate and Potash.....	10	..	4
Armour Sweet Potato Special.....	8	2.50	3
Armour Slaughter House Fertilizer.....	8	2	2
Armour's Defiance	8	2.50	3

Acme Manufacturing Co., Wilmington, N. C.—

Acme Fertilizer	8	3	2.50
Acme Fertilizer for Tobacco.....	8	3	2.50
Acme Truck Grower.....	6	4	8
Acme Cotton Grower.....	9	2.75	2
Acme Standard Guano.....	8	2.50	2
Acme Soluble Bone	8	2.50	1
Acme Special Grain Fertilizer.....	8	2	2
Acme High Grade Guano.....	6	6	8
Acme High Grade Acid Phosphate.....	14	..	..
Acme Ammoniated Dissolved Bone	8	2	1
Acme Acid Phosphate.....	13	..	..
Acme Strawberry Top Dressing.....	8	2	4
Lattimore's Complete Fertilizer.....	8	2.50	2
Cotton-seed Meal Guano.....	8	2	2
Quick Step	8	4	4
Pee Dee Special.....	8	3	3
16 Per Cent Acid Phosphate.....	16	..	..
Gem Fertilizer	8	2	2
Acid Phosphate	12	..	..
Bone and Potash.....	11	..	2
Bone and Potash.....	8	..	4
Bone and Potash.....	8	..	3
Bone and Potash.....	8	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bone and Potash.....	10	..	4
Bone and Potash.....	10	..	3
Bone and Potash.....	10	..	2
Tip Top Crop Grower.....	8	2.50	3
Pure German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	48
Tip Top Tobacco Grower.....	8	2.50	3

Ashepool Fertilizer Co., Charleston, S. C.—

Ashepool Watermelon Guano.....	10	4	5
Ashepool Fertilizer	9	2.25	1
Ashepool Harrow Brand Raw Bone Superphosphate.	9	2	2
Ashepool Wheat and Oats Specific.....	9	2	1
Ashepool XXX Guano.....	8.65	2	2
Ashepool XX Guano.....	8.50	2	2
Ashepool Fruit Grower.....	8	4.75	2.75
Ashepool Perfection Guano.....	8	4	6
Ashepool High Grade Guano.....	8	4	4
Ashepool Golden Tobacco Producer.....	8	3	3
Ashepool X Tobacco Fertilizer.....	8	3	3
Ashepool Bird and Fish Guano.....	8	3	3
Ashepool Meal Mixture.....	8	3	3
Ashepool High Grade Ammoniated Superphosphate.	8	3	2
Ashepool Special Cotton-seed Meal Guano.....	8	3	2
Ashepool Farmers' Special.....	8	2.50	3
Ashepool Circle Guano.....	8	2.50	2
Ashepool Guano	8	2.50	1
Ashepool Special Fertilizer.....	8	2	2
Ashepool Truck Guano.....	7	5	5
Ashepool Vegetable Guano.....	5	5	5
Ashepool High Grade Acid Phosphate Potash.....	12	..	1
Ashepool Potash Acid Phosphate.....	11	..	1
Ashepool Superpotash Acid Phosphate.....	10	..	4
Ashepool Potash Compound.....	10	..	3
Ashepool Dissolved Phosphate.....	16	..	..
Ashepool XXXX Acid Phosphate.....	14	..	..
Ashepool High Grade Acid Phosphate.....	13	..	..
Ashepool XXX Acid Phosphate.....	13	..	..
Ashepool Dissolved Bone.....	12	..	..
Ashepool XX Acid Phosphate.....	12	..	..
Eutaw High Grade Acid Phosphate.....	13	..	..
Eutaw XX Acid Phosphate.....	12	..	..
Eutaw Superpotash Acid Phosphate.....	10	..	4
Eutaw Potash Acid Phosphate.....	11	..	1
Eutaw High Grade Acid Phosphate and Potash....	12	..	1
Eutaw X Golden Fertilizer.....	8	3	4
Eutaw Special Cotton-seed Meal Guano.....	8	3	4
Eutaw XX Guano.....	8.50	2	2
Eutaw XXX Guano.....	9	2	2
Eutaw Fertilizer	9	2.25	1
Eutaw Circle Guano.....	8	2.50	2
P. D. Fertilizer.....	8	2	1
Circle Bone	13	..	..
Brownwood Acid Phosphate.....	8	..	4
Enoree Acid Phosphate.....	10	..	2
Taylor's Circle Guano.....	9	2	4
Palmetto Potash Acid Phosphate.....	11	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Carolina High Grade Acid Phosphate.....	13	..	..
Carolina Guano	8	2	2
Carolina XXX Guano.....	8	3	3
Coomassie Acid Phosphate.....	12	..	..
Coomassie Circle Fertilizer.....	8	2	2
Muriate of Potash.....	..	..	45
Nitrate of Soda.....	..	18	..
German Kainit .....	..	..	12

A. D. Adair and McCarty Bros., Atlanta, Ga.—

David Harup Extra High Grade Guano.....	10	4	4
Adair's High Grade Blood and Bone.....	10	3	3
Adair's Soluble Pacific Guano.....	10	2	2
Adair's Ammoniated Dissolved Bone.....	8	2	2
Planter's Soluble Fertilizer C. S. M.....	8	2	2
Adair's Blood and Bone.....	9	2	1
A. and M. 13-4.....	13	..	4
High Grade Potash Compound.....	10	..	4
Adair's Wheat and Grass Grower.....	10	..	4
Adair's Special Potash Mixture.....	8	..	4
Adair's Formula	10	..	2
Adair's High Grade Dissolved Bone.....	16	..	..
Adair's Dissolved Bone.....	12	..	..
Special Wheat Compound.....	10	2	4
Special Cotton Compound.....	10	2	4

Anderson Phosphate and Oil Co., Anderson, S. C.—

Anderson Extra Best Guano.....	10	4	4
Anderson Special Fertilizer.....	8	3	3
Anderson Truck Fertilizer.....	8	4	4
Anderson XXXX Potash Bone.....	10	..	4
Anderson Cotton Fertilizer.....	8	2	2
Anderson XXX Potash Bone.....	8	..	4
Anderson XXXXX Potash Bone	12	..	2
Anderson Superphosphate	16	..	..
Anderson XX Potash Bone.....	10	..	2
Anderson Special Dissolved Bone.....	14	..	..
Anderson Special Potash Dissolved Bone.....	15	..	..
Anderson High Grade Dissolved Bone.....	13	..	..
Anderson Extra Guano.....	9	2	3
Anderson Kainit .....	..	..	12

American Agricultural Chemical Co., New York, N. Y.—

Holmes & Dawson Productive Cotton and Peanut Grower	9	2.75	2
Holmes & Dawson Gold Dust Guano.....	9	2	2
Holmes & Dawson Triumph Soluble.....	8	2	2
Savage Sons & Co.'s Purity Guano.....	8	2	2
Victor Truck Phosphate.....	8	4	7
Zell's 10 Per Cent Trucker.....	5	10	3
Zell's 7 Per Cent Potato and Vegetable Manure....	6	7	5
Zell's Truck Guano.....	7	5	5
Zell's Special Compound for Potatoes and Vegetables	8	3	4
Zell's Tobacco Fertilizer.....	8	3	4
Zell's Bright Tobacco Grower.....	8	3	3
Zell's Reliance High Grade Manure.....	8	3	3
Zell's Royal High Grade Fertilizer.....	9	2.50	2
Zell's Calvert Guano.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Zell's Special Compound for Tobacco.....	8	2	2
Zell's Ammoniated Bone Superphosphate.....	8	2	1
Zell's High Grade Potash Fertilizer.....	10	..	4
Zell's Electric Phosphate.....	10	..	2
Zell's Dissolved Bone Phosphate.....	14	..	..
Detrick's Virginia Trucker.....	6	7	7
Detrick's Gold Basis.....	6	7	5
Detrick's High Grade Potato Manure.....	4	7	5
Detrick's Special Trucker.....	7	5	5
Detrick's Truckers' Bone Phosphate.....	4	5	9
Detrick's Gold Eagle.....	6	3	6
Detrick's Quickstep Bone Phosphate.....	8	3	4
Detrick's Special Tobacco Fertilizer.....	8	3	3
Detrick's Vegetator Ammoniated Superphosphate...	8	2.50	3
Detrick's Kangaroo Komplete Kompound.....	8	2	3
Detrick's Royal Crop Grower.....	8	2	2
Detrick's Fish Mixture.....	8	2	2
Detrick's Ammoniated Bone.....	8	2	1.50
Detrick's Victory Alkaline Bone.....	12	..	5
Detrick's P. and B. Special.....	12	..	3
Detrick's Soluble Bone Phosphate and Potash.....	10	..	2
Detrick's XXtra Acid Phosphate.....	14	..	..
Lazaretto Truck Grower.....	5	10	3
Lazaretto Truckers' Favorite.....	6	7	5
Lazaretto Early Trucker.....	7	5	5
Lazaretto Challenge Fertilizer.....	8	3	3
Lazaretto Special for Tobacco and Potatoes.....	8	3	3
Lazaretto Climax Plant Food.....	8	2.50	3
Lazaretto Universal Compound	8	2.50	2
Lazaretto Crop Grower.....	8	2	2
Lazaretto High Grade Dissolved Bone and Potash..	12	..	5
Lazaretto Alkaline Bone Phosphate.....	12	..	3
Lazaretto Dissolved Bone and Potash.....	10	..	2
Lazaretto Acid Phosphate.....	14	..	2
Canton Chemical Truckers' Special 10 Per Cent....	5	10	3
Canton Chemical Truckers' Special 7 Per Cent.....	6	7	5
Canton Chemical Excelsior Trucker.....	7	5	5
Canton Chemical Baker's Tobacco Fertilizer.....	8	3	3
Canton Chemical Superior High Grade Fertilizer...	8	3	3
Canton Chemical C. C. Special Compound.....	8	2.50	6
Canton Chemical Baker's Standard High Grade Guano	8	2.50	3
Canton Chemical Virginia Standard High Grade Manure.....	8	2.50	2
Canton Chemical Game Guano.....	8	2	2
Canton Chemical Soluble Alkaline Bone.....	12	..	3
Canton Chemical Soluble Bone and Potash.....	10	..	2
Canton Chemical Baker's Dissolved S. C. Bone....	14	..	..
Bull Head Potato and Vegetable Manure.....	6	5	7
Honey Pod Trucker.....	7	5	8
Bell's Victoria Animal Bone Compound.....	9	2.25	4
Lazaretto Retriever Animal Bone Fertilizer.....	9	2.25	4
Canton Chemical Animal Bone Fertilizer.....	9	2.25	4
Detrick's Superior Animal Bone Fertilizer.....	9	2.25	4
Slingluff's British Mixture.....	8	2.50	2.50
Zell's Fish Guano	8	2	2
Enterprise Alkaline Phosphate	8	..	5

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>American Fertilizer Co., Norfolk, Va.—</i>			
10 Per Cent Ammonia Guano.....	7	10	2.50
Standard 7 Per Cent Ammoniated Guano.....	7	7	5
American Irish Potato Grower.....	7	5	5
American 7-7-7 for Irish Potatoes.....	7	7	7
Special Potato Manure.....	6	5	7
Special Potato Guano.....	7	5	7
Strawberry Guano	9	3.50	9
Stable Manure Substitute.....	7	3	4
American Fish Scrap Guano.....	7	4	4
Kale, Spinach and Cabbage Guano.....	7	5	4
American Ammoniated Bone.....	8	2	1
Peruvian Mixture	8	2	1.50
American No. 1 Fertilizer.....	8	2.50	3
American No. 2 Fertilizer.....	8	2	2
Blood and Bone Compound.....	8	2.50	1
Bone and Peruvian Guano.....	8.50	2	2.10
Bone and Peruvian Guano for Tobacco.....	8	2	2
American Cotton Compound.....	8	2	2
Bob White Fertilizer for Tobacco.....	8	2.50	2.50
American Eagle Guano.....	8	3	3
Murray's Special Fertilizer.....	8	3	3
J. G. Miller & Co.'s Yellow Leaf Tobacco.....	8	3	3
Special Formula Guano for Yellow Leaf Tobacco...	9	3.50	5
Pitt County Special Fertilizer.....	9	3.50	5
Double Dissolved Bone and Potash.....	10	..	4
American Special Potash Mixture for Wheat.....	8	..	2
Dissolved Bone and Potash for Corn and Wheat...	10	..	2
American High Grade Acid Phosphate.....	16	..	..
High Grade Acid Phosphate.....	14	..	..
Eagle High Grade Acid Phosphate.....	13	..	..
Acid Phosphate	12	..	..
Acid Phosphate	10	..	..
A. L. Hannok's Special Formula Guano.....	8	2	2
Bone and Peruvian Guano.....	8	2	2
Peruvian Mixture Guano especially prepared for Sweet Potatoes	8	4	5
Pure Dissolved Bone.....	14	2.50	..
Ground Fish Scrap.....	..	10	..
Bone Meal	(Total)	4.50	..
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	49
Muriate of Potash.....	..	..	50
W. B. Cooper's High Grade Acid.....	14	..	..
W. B. Cooper's Cape Fear Acid.....	13	..	..
W. B. Cooper's Cotton Grower	8	2	2
W. B. Cooper's Pure German Kainit.....	..	..	12
N. C. and S. C. Cotton Grower.....	8	4	4
Johnson's No. 1 Fertilizer	8	2.50	3
<i>The John L. Bailey Co., Elm City, N. C.—</i>			
Stag Brand	8	2	2
Fairmount	8	3	3
<i>Baugh & Sons Co., Philadelphia, Pa., and Norfolk, Va.—</i>			
Baugh's 5-6-5 Guano.....	6	5	5
Baugh's Sweet Potato Guano.....	8	3	3
Baugh's 16 Per Cent Acid Phosphate.....	16	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Baugh's Fine Ground Fish.....	10	..	..
Baugh's High Grade Acid Phosphate.....	14	..	..
Baugh's Soluble Alkaline Superphosphate.....	10	..	2
Baugh's High Grade Potash Mixture.....	10	..	4
Baugh's 12-5 Phosphate and Potash.....	12	..	5
Baugh's Cabbage Guano.....	6	7	5
Baugh's Fruit and Berry Guano.....	8	3	10
Baugh's Wheat Fertilizer for Wheat and Grass....	8	2	2
Baugh's Fish Bone and Potash.....	8	4	4
Baugh's Fish Mixture	8	2	2
Baugh's 7 Per Cent Potato Guano.....	6	7	5
Baugh's New Process 10 Per Cent Guano.....	5	10	2.50
Baugh's Grand Rapid High Grade Truck Guano....	8	3	3
Baugh's High Grade Tobacco Guano.....	8	3	3
Baugh's Animal Bone and Potash Compound.....	8	2	2
Baugh's Pure Dissolved Animal Bone.....	13	2.50	..
Baugh's Raw Bone Meal.....	21.50	4.50	..
Baugh's Peruvian Guano Substitute for Potatoes and all Vegetables	6	5	7
Baugh's Double Eagle Twenty-five Dollar Phosphate and Raw Bone Superphosphate.....	8	2	1
Glover's Special Potato Grower.....	7	4	8
Benthol's Cotton and Peanut Grower.....	8	2	2
Genuine German Kainit.....	..	..	12
Fine Ground Blood.....	..	16	..
Nitrate of Soda.....	..	18.50	..
Sulphate of Ammonia.....	..	25	..
High Grade Sulphate of Potash.....	..	..	48
Muriate of Potash.....	..	..	48
Baugh's Special Tobacco Guano.....	8	3	5
Baugh's High Grade Cotton and Truck Guano.....	10	2	2
Baugh's Special Manure for Melons.....	10	4	4
Baugh's Potato and Truck Special.....	7	3.50	7
Baugh's Complete Animal Bone Fertilizer.....	8	2	5
Baugh's Special Potato Manure.....	5	2	10
Baugh's Special Guano.....	8	4	6
<i>R. J. Blackwell, Marion, S. C.—</i>			
German Kainit .....	..	..	12
<i>J. A. Benton, Ruffin, N. C.—</i>			
N. C. Bright Fertilizer	9	2	2
<i>Bradley Fertilizer Co., Boston, Mass., and Charleston, S. C.—</i>			
B. D. Sea Fowl Guano.....	9	2.25	1
Bradley's Patent Superphosphate.....	9	2.25	1
Bradley's High Grade Guano.....	8	3	3
Bradley's Ammonia' d Dissolved Bone.....	8	2.25	1
Eagle Ammoniated Bone Superphosphate.....	8	2.25	1
Bradley's Cereal Guano.....	8	2	2
Bradley's X Guano.....	8	2	2
Bradley's Wheat Guano.....	10	..	2
Bradley's High Grade Acid Phosphate.....	14	..	..
Bradley's XXX Acid Phosphate.....	13	..	..
Bradley's Acid Phosphate.....	12	..	..
Bradley's Palmetto Acid Phosphate.....	12	..	..
German Kainit .....	..	..	12
Bradley's Bone and Potash.....	10	..	2
Bradley's O. Special Guano.....	8	4	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Burton's Best	8	3	3
Burton's Butcher Bone.....	8	2	2
Burton's Soluble Guano.....	8	2	1
Burton's High Grade.....	8	2.50	3
Burton's High Grade Tobacco.....	8	4	4
Tobacco Queen	8	3	3
Acid Phosphate	14	..	..
<i>J. L. Bailey & Co., Elm City, N. C.—</i>			
Stag Brand	8	2	2
Fairmount	8	3	3
<i>R. R. Barnes, Barnesville, S. C.—</i>			
Nitrate of Soda .....	..	19	..
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Resolute Acid Phosphate 16 Per Cent.....	16	..	..
Laurel Potash Mixture.....	10	..	2
Victory Special Crop Grower.....	7	4	4
Berkley Plant Food.....	10	..	4
Berkley Bone and Potash Mixture.....	11	..	2
Berkley Genuine German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Berkley Acid Phosphate.....	14	..	..
Berkley Ammoniated Superphosphate.....	8	2	1
Mascot Truck Guano.....	7	5	5
Royal Truck Grower.....	6	7	5
Advance Crop Grower.....	8	3	3
Berkley Tobacco Guano.....	8	3	3
Brandon Superphosphate	8	2	2
Select Crop Guano.....	8.50	2.50	2.50
Monitor Animal Bone Fertilizer.....	9	2.25	4
<i>William Bragaw & Co., Washington, N. C.—</i>			
Pamlico Trucker	7	5	8
Tar Heel Special Guano.....	8	2	2
Havana Tobacco Guano	8	3	3
Beaufort County Guano	8	3	3
Tuckahoe Tobacco Guano	8	2.50	3
Chocowinity Special Tobacco	5	4	6
Old Reliable Premium	8	2	2
Cotton-seed Meal .....	..	7.50	..
<i>Blackstone Guano Co., Inc., Blackstone, Va.—</i>			
Old Bellefonte	8	4	2
Jim Crow for Tobacco.....	8	3	3
Red Letter	8	2	2
Red Warrior for Tobacco.....	9	3	3
Blackstone Special for Tobacco.....	9	3	3
Alliance Guano	8	2	2
Alliance Guano for Tobacco	8	2	2
B. G. Co. Inc. Mixed Bone and Potash.....	10	..	4
B. G. Co. Inc. Mixed Acid Phosphate.....	14	..	..
Hard Cash	8	2.50	2
Bellefonte.....	8	3	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Best & Thompson, Goldsboro, N. C.—</i>			
Pure German Kainit.....	..	..	12
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano	8	3	3
Clayton Cotton Grower.....	8	2	2
<i>Columbia Guano Co., Norfolk, Va.—</i>			
Columbia 7 Per Cent Truck Guano.....	7	7	7
Columbia Potato Guano	7	5	5
Columbia Special Truck Guano	8	4	4
Columbia Soluble Guano	8	2	2
Columbia Special 4-8-3.....	8	4	3
Columbia H. G. Special Tobacco Guano.....	8	2.50	2
Columbia Special Wheat Fertilizer.....	8	2	2
Columbia Special	8	4	3
Columbia C. S. M. Special.....	9	2.75	2
Columbia 8 and 2 Bone and Potash Mixture.....	8	..	2
Columbia 8 and 2.25 Bone and Potash Mixture....	8	..	2.25
Columbia 8 and 4 Bone and Potash Mixture.....	8	..	4
Columbia Bone and Potash Mixture.....	10	..	2
Columbia Bone and Potash for Grain.....	10	..	3
Columbia 10 and 4 Bone and Potash Mixture.....	10	..	4
Columbia Acid Phosphate	12	..	..
Columbia H. G. Dissolved Bone.....	13	..	..
Columbia 14 Per Cent Acid Phosphate	14	..	..
Columbia H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Rex Brand Ammoniated Guano.....	8	2.50	1
Carolina Soluble Guano	8	2	1
Crown Brand Peanut Guano	7	..	5
McRae's Special	9	5	7
Hayes' Special	8	4	3
Crews' Special	5	5	10
McRae's High Grade Guano	8	4	7
Pellican Ammoniated Guano	8	4	4
Hyco Tobacco Guano	8	3	3
Olympia Cotton Guano.....	8	3	3
Genuine German Kainit .....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Cotton-seed Meal .....	..	7.50	..
Our Best Meal Guano	8	3	3
<i>Cumberland Bone and Phosphate Co., Portland, Maine, and Charleston, S. C.—</i>			
Cumberland Bone and Superphosphate of Lime....	8	2.25	1
<i>Cowell, Swan & McCotter Co., Bayboro, N. C.—</i>			
Cowell, Swan & McCotter Co.'s Bone Phosphate.....	14	..	..
Cowell, Swan & McCotter Co.'s Crop Guano.....	8	2	2
Cowell, Swan & McCotter Co.'s Bone and Fish.....	8	2	2
Cowell, Swan & McCotter Co.'s 14 Per Cent Acid Phosphate	14	..	..
Cowell, Swan & McCotter Co.'s Rust Proof Cotton Guano	8	2	3
Cowell, Swan & McCotter Co.'s Standard Cotton Grower.....	8	4	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Cowell, Swan & McCotter Co.'s Quick Grower Guano	8	2.50	3
Cowell, Swan & McCotter Co.'s Great Cabbage and Potato Guano	7	7	7
Cowell, Swan & McCotter Co.'s Aurora Trucker....	7	5	7
Cowell, Swan & McCotter Co.'s Oriental Trucker....	7	5	8
Cowell, Swan & McCotter Co.'s High Grade Truck Guano	7	5	5
Cowell, Swan & McCotter Co.'s Potato Favorite Guano	7	4	7
Cowell, Swan & McCotter Co.'s Champion Guano....	8	3	3
Cowell, Swan & McCotter Co.'s German Kainit....	..	..	12
Cowell, Swan & McCotter Co.'s Tobacco Guano....	8	3	3
Cowell, Swan & McCotter Co.'s Cabbage Guano....	5	10	2.50
Carawan's Special	6	3	4
Camlins Special	7	2.75	7

Craven Chemical Co., New Bern, N. C.—

Elite Cotton Grower	8	2	2
Duplin Tobacco Guano	8	3	3
Trent Bone and Potash	10	..	2
Neuse Truck Guano	6	6	6
Pantego Potato Guano	7	5	7
Marvel Great Crop Grower	8	2.50	3
Hanover Standard Guano	8	4	4
Gaston High Grade Fertilizer.....	8	3	3
Panama Prolific Crop Grower	8	2.50	3
Manteo Tobacco Guano	8	3	3
Wiona Guano	8	2.50	3
Genuine German Kainit .....	..	..	12
New Bern Bone and Potash	12	..	4
Jewel Acid Phosphate	14	..	..

Calder Bros., Wilmington, N. C.—

Muriate of Potash .....	..	..	50
Genuine German Kainit .....	..	..	12

Chickamauga Fertilizer Works, Atlanta, Ga.—

Ben Hur H. G. Guano.....	10	3	3
Chickamauga H. G. Fertilizer	10	2	2
H. G. Plant Food, C. S. M.....	10	2	2
Fish Scrap Guano	10	2	2
Complete Fertilizer	8	2	2
Blood and Bone	9	2	1
Standard Corn Grower	8	2	2
Bone and Potash	10	..	2
Wheat and Corn Grower	10	..	4
13-4	13	..	4
High Grade Dissolved Bone No. 16.....	16	..	..
High Grade Dissolved Bone.....	14	..	..
Dissolved Bone	12	..	..
Alkaline Bone	8	..	4
Special Corn Compound.....	10	2	4
Special Wheat Compound	10	2	4
Special Vegetable Compound.....	10	2	4
Georgia Homestead Guano.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Contentnea Guano Co., Wilson, N. C.—</i>			
Contentnea Tobacco Grower	8	3	3
Contentnea Cotton Grower	8	3	2.50
Pick Leaf Tobacco Special	8	3.50	5
Top Notch Guano	8	2	2
Woodard's Blood and Bone Cotton Compound.....	8	2	2
<i>W. B. Cooper, Wilmington, N. C.—</i>			
Muriate Potash .....	..	..	50
Nitrate Soda .....	..	18	..
Kainit.....	..	..	12
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano	8	3	3
Clayton Cotton Grower	8	2	2
<i>Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—</i>			
Horne's Best Guano	8	3	3
Planters' Pride Guano	8	2.50	3
Caraleigh Top Dresser	3	10	4
Caraleigh Special Tobacco Grower.....	8	2.50	3
Pacific Tobacco and Cotton Grower.....	9	2.75	2
Eclipse Ammoniated Guano	8	2.50	2
Eli Ammoniated Guano	8	2	2
Crown Ammoniated Guano	8	2	1.50
Comet Guano	8	2	1
Horne & Son's High Grade Bone and Potash.....	11	..	5
Special Bone and Potash Mixture.....	10	..	4
Climax Dissolved Bone.....	14	..	..
Buncombe Wheat Grower	8	..	4
Electric Bone and Potash	10	..	2
Sterling High Grade Acid Phosphate.....	13	..	..
Staple Acid Phosphate	12	..	..
Dandy Acid Phosphate	10	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Morris and Scarboro's Special Bone and Potash....	10	..	3
Genuine German Kainit .....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash .....	..	..	50
Muriate of Potash.....	..	..	50
Bone Meal	(Total) 20	4.75	..
<i>The Coe-Mortimer Co., Charleston, S. C.—</i>			
Bone Meal	(Total) 20	4.75	..
Genuine Peruvian Guano	20	4	2.75
Genuine Peruvian Guano.....	9	9	2
Kainit.....	..	..	12
Sulphate.....	..	..	48
Muriate of Potash .....	..	..	49 & 50
Nitrate of Soda .....	..	18	..
Basic Slag	(Total) 17	..	..
<i>W. H. Camp, Petersburg, Va.—</i>			
Camp's Prepared Chemicals No. 1.....	8	3.50	7.50
Camp's Prepared Chemicals No. 3.....	8	2.75	2
Camp's Prepared Chemicals for Potatoes.....	7	7.50	10
Camp's Lion Brand.....	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Crow Fertilizer Co., Monroe, N. C.—</i>			
Crow's 14 Per Cent Acid Phosphate.....	14	..	..
Union County Special.....	8	2	2
Crow's Blood and Fish.....	8	3	3
Muriate of Potash.....	..	..	50
Kainit .....	..	..	12
<i>Dixie Guano Co., Raleigh, N. C.—</i>			
Old Plantation Superphosphate	8	2	2
Sulky Plow Brand	8	3	2
Radium.....	8	4	5
Carolina Special Ammoniated	8	3	3
Jeff Davis Special	9	2.75	2
Dixie Star Ammoniated	8	2	1
Dixie Champion for Wheat and Corn.....	10	..	1.50
Battle's Blood and Bone	8	2.50	3
Niagara Soluble Bone	8	2.50	2
<i>Etiwan Fertilizer Co., Charleston, S. C.—</i>			
Etiwan High Grade Acid Phosphate	14	..	..
Etiwan High Grade Cotton Fertilizer	8	3	3
Etiwan Special Cotton Fertilizer	8	4	4
Etiwan Dissolved Bone	13	..	..
Etiwan Soluble Bone with Potash	10	..	3
Etiwan Potash Bone	10	..	4
Etiwan Special Potash Mixture	8	..	4
Etiwan Ammoniated Fertilizer	8	2	2
Etiwan Cotton Compound	8	3	3
Etiwan Acid Phosphate with Potash.....	11	..	1
Etiwan Ammoniated Dissolved Bone.....	8.65	2	2
Etiwan Blood and Bone Guano.....	8	2.50	1
Diamond Soluble Bone.....	13	..	..
Diamond Soluble Bone with Potash.....	10	..	2
Plow Brand Ammoniated Dissolved Bone.....	8.65	2	2
Plow Brand Ammoniated Fertilizer.....	8	2	2
Plow Brand Raw Bone Superphosphate.....	8	2.50	1
Plow Brand Special Tobacco Fertilizer.....	8	4	4
Plow Brand Acid Phosphate with Potash.....	11	..	1
XX Acid Phosphate with Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
<i>Eureka Fertilizer Co., Perryville, N. C.—</i>			
Alkaline Bone	10	..	2
Farmer's Favorite Bone Phosphate.....	8	2	2
5 Per Cent Alkaline	12	..	5
Camden Special	6	5	7
Potato Special	8	2.50	3
P. & P. Superphosphate	14	..	..
High Grade Trueker	8	2	10
<i>Farmers Guano Co., Raleigh, N. C.—</i>			
Farmers' High Grade Acid Phosphate.....	13	..	..
16 Per Cent Acid Phosphate.....	16	..	..
State Standard Guano.....	8	2	2
Big Crop Guano.....	8	2.50	3
Century Bone and Potash Mixture.....	10	..	2
Special Bone and Potash Mixture.....	10	..	4
14 Per Cent Acid Phosphate.....	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Golden Grade Guano.....	8	3	3
Toco Tobacco Guano.....	8	2.50	3
Bone Meal (Total)	20	4.75	..
<i>W. S. Farmer & Co., Baltimore, Md.—</i>			
W. S. Farmer & Co.'s Fish Mixture.....	8	2	2
Tampico.....	8	2	2
Hawk Eye	8	3	3
Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Nitrate of Soda .....	..	10	..
<i>Farmers Cotton Oil Co., Wilson, N. C.—</i>			
Dean's Special Guano.....	8	4.50	7
Golden Gem Guano.....	8	3	3
Graves' Cotton Grower Guano.....	8	3	3
Planters' Friend Guano.....	8	2.50	3
Carolina Choice Tobacco Guano.....	8	2.50	3
Wilson High Grade Guano.....	8	2.75	2
Farmers Special Guano.....	8	2	2
Crop King Guano.....	8	2	2
Xtra Good Bone and Potash.....	10	..	2
16 Per Cent Acid Phosphate.....	16	..	..
Bonum Acid Phosphate.....	14	..	..
Contentnea Acid Phosphate.....	13	..	..
Regal Acid Phosphate.....	12	..	..
Cotton-seed Meal .....	..	7.50	..
German Kainit .....	..	..	12
J. D. Farrar's Special Guano for Cotton and Tobacco	8	3	3
Perfect Top Dresser.....	2	10	5
Wilson Top Dresser.....	2	11	4
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Regal Tobacco Guano.....	8	3.50	5
<i>Germofert Manufacturing Co., Charleston, S. C.—</i>			
Germofert Patent Potato Manure.....	..	5	6
Germofert Patent Cabbage Fertilizer.....	..	6	7
Germofert Patent Wheat and Grain Compound....	..	3	7
Germofert Patent Vegetable Guano.....	..	4	6
<i>W. R. Grace, New York, N. Y.—</i>			
Nitrate of Soda.....	..	18.50	..
<i>Greensboro Cotton Oil Co., Greensboro, Ala.—</i>			
Cotton-seed meal .....	..	7.50	..
<i>Griffith & Boyd, Baltimore, Md.—</i>			
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
Spring Crop Grower.....	6.50	2	4.50
Growers' Favorite	8	4	4
Beef Blood and Bone.....	8	2.50	1
Ammoniated Bone Phosphate.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Hadley, Harris & Co., Wilson, N. C.—</i>			
Daisy Fish Mixture	8	2	2
Hadley's Boss Guano	8	2.75	2.50
Golden Weed Tobacco Guano	8	3	3.50
John Hadley's High Grade Plant Food.....	8	2	2
Bone and Potash Mixture	10	..	2
<i>Home Fertilizer Chemical Co., Baltimore, Md.—</i>			
Cerealite Top Dressing.....	..	9	2.50
Boykin's Home Potato Grower.....	6	4	4
Phoenix Crop Grower.....	8	3	3
Boykin's Cereal Fertilizer.....	8	2	2
Boykin's Dissolved Animal Bone.....	12	2	..
Boykin's Alkaline Bone.....	10	..	2
Boykin's Vegetable Fertilizer.....	6	5	6
Boykin's High Grade Acid Phosphate.....	14	..	..
Boykin's Royal Potato Fertilizer.....	6	7	5
Home Fertilizer .....	..	7	7
Yancey's Formula for Yellow Leaf Tobacco.....	8	3	2
German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
<i>The Hubbard Fertilizer Co., Baltimore, Md.—</i>			
Hubbard's Trucker 7 Per Cent Royal Seal Co.....	6	7	5
Hubbard's Trucker 10 Per Cent Guano.....	4	10	4
Hubbard's 5 Per Cent Truck Guano.....	6	5	5
Hubbard's Jersey Trucker.....	8	2	10
Hubbard's Royal Ensign.....	8	3	4
Hubbard's Yellow Wrapper Guano.....	8	3	3
Hubbard's Exchange Guano.....	8	2	2
Hubbard's Standard Bone Superphosphate.....	8	2	3
Hubbard's Soluble Bone and Potash.....	10	..	2
Hubbard's Special Mixture of Bone and Potash.....	10	..	4
German Kainit .....	..	..	12.40
Long's Favorite	8	2.50	3
Hubbard's H. G. Soluble Tennessee Phosphate.....	14	..	..
<i>M. P. Hubbard & Co., Baltimore, Md.—</i>			
Hubbard's Maryland Special Vegetable Grower....	7	5	5
<i>The Hampton Guano Co., Norfolk, Va.—</i>			
Dauntless Potash Mixture.....	10	..	2
Supreme Acid Phosphate 16 Per Cent.....	16	..	..
Hampton Crop Grower.....	10	..	4
Hampton Bone and Potash Mixture.....	11	..	2
Hampton Acid Phosphate.....	14	..	..
Hampton Ammoniated Superphosphate.....	8	2	1
Hampton Tobacco Guano.....	8	3	3
Arlington Animal Bone Fertilizer	9	2.25	4
Alpha Crop Grower.....	8.50	2.50	2.50
Shirley Superphosphate	8	2	2
Little's Favorite Crop Grower.....	7	4	4
Reliance Truck Guano.....	7	5	5
Virginia Truck Grower.....	6	7	5
P. P. P. Princess Prolific Producer.....	8	3	3
Hampton Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Hardison Co., Wadesboro, N. C.—</i>			
Nitrate of Soda.....	..	18	..
<i>Humphreys-Godwin & Co., Memphis, Tenn.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>S. B. Harrell & Co., Norfolk, Va.—</i>			
Harrell's Champion Cotton and Peanut Grower...	8	2	2
Harrell's Truck Guano.....	6	7	5
Harrell's Acid Phosphate.....	14	..	..
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial Martin County Special Crop Grower.....	9	2.75	2
Imperial Fish and Bone.....	6	4	4
Imperial X. L. O. Cotton Guano.....	8	3	3
Imperial 5-6-7 Potato Guano.....	6	5	7
Imperial Williams' Special Potato Guano.....	6	5	5
Imperial Tobacco Guano.....	8	3	3
Imperial Sweet Potato Guano.....	6	2	6
Imperial 10 Per Cent Guano.....	5	10	2.50
Imperial 7-7-7 Potato Guano.....	7	7	7
Imperial Special 7 Per Cent Guano for Potatoes...	5	7	5
Imperial Champion Guano.....	8	2	2
Imperial Laughinghouse Special Tobacco Guano...	4	4	6
Imperial Cubanola Tobacco Guano.....	4	3	5
Imperial Cisco Soluble Guano.....	8	2	2
Imperial Lucky Strike Potato Guano.....	7	5	8
Imperial Cotton Grower.....	8	2	1.50
Imperial Peanut and Corn Guano.....	8	2	2
Imperial Standard Premium.....	8	2	1.50
Imperial High Grade Acid Phosphate.....	14	..	..
Imperial Tennessee Acid Phosphate.....	16	..	..
Imperial Bone and Potash.....	10	..	2
Imperial Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
Imperial Guano for Bright Tobacco.....	8	2.50	3
Imperial 17 Per Cent Acid Phosphate.....	17	..	..
Imperial High Grade Sweet Potato Guano.....	7	5	6
Tankage .....	..	13	..
<i>Wm. Krogan, Asheville, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>R. L. Kirkwood & Co., Bennettsville, S. C.—</i>			
Nitrate of Soda.....	..	18	..
<i>Lorene Cotton-seed Oil Mills, Mooresville, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Lester's Agricultural Chemical Works, Newark, N. J.—</i>			
Lester's Standard Pure Bone Superphosphate.....	9	2	2
Lester's Success Fertilizer.....	8	2	2
Lester's Ammoniated Dissolved Bone Fertilizer....	8	2.50	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>A. S. Lee & Sons Co., Richmond, Va.—</i>			
Lec's Special Corn Fertilizer.....	8	..	2
Lec's Plant Bed Fertilizer.....	8	2	2
Lec's Special Wheat Fertilizer.....	8	..	2
Lec's Prepared Agricultural Lime.....	..	..	2
Lec's High Grade Bone and Potash.....	9	..	4
<i>The Mapes Formula and Peruvian Guano Co., New York, N. Y.—</i>			
Complete Manure "A" Brand.....	10	3	2.50
Mapes' Economical Potato Manure.....	4	4	8
Mapes' Corn Manure.....	8	3	6
Mapes' Vegetable or Complete Manure for Light Soils	6	6	6
<i>D. B. Martin Co., Richmond, Va.—</i>			
Martin's 7 Per Cent Guano.....	6	7	5
Martin's Early Truck and Vegetable Grower.....	6	4	8
Martin's Claremount Vegetable Grower.....	7	3	5
Martin's Red Star Brand.....	6	5	5
Martin's Bull Head Fertilizer.....	8	3	3
Martin's Tobacco Special.....	8	3	3
Martin's Carolina Cotton Fertilizer.....	8	2	2
Martin's Old Virginia Favorite.....	8	2	2
Martin's Corn and Cereal Special.....	8	2	2
Martin's Raw Bone Meal..... (Total)	21	4.50	..
Martin's Pure Ground Bone..... (Total)	22.90	2	..
Martin's Animal Bone and Potash Compound.....	16	2	2.50
Martin's Pure Dissolved Animal Bone.....	12	2	..
Martin's Acid Phosphate.....	16	..	..
Martin Acid Phosphate.....	14	..	..
Martin's Potash and Soluble Bone.....	12	..	5
Martin Potash and Soluble Bone.....	12	..	3
Martin Potash and Soluble Bone.....	10	..	5
Martin's Potash and Soluble Bone.....	10	..	2
Pure Ground Bone..... (Total)	22.90	3	..
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
Martin's Animal Tankage (ground).....	16	6	..
Martin's Gilt-edge Potato Manure.....	3	7	10
Martin's High Grade Blood.....	..	17	..
Martin's Blood .....	..	15	..
Martin's Animal Bone Potato Manure.....	6	5	7
Blood .....	..	15	..
Blood .....	..	12	..
Blood .....	..	13	..
<i>Morgan Oil and Fertilizer Co., Red Springs, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Thomas Meehan & Sons, Inc.—</i>			
Meehan Canada Hardwood Ashes.....	..	..	5.32
Meehan Bone Meal..... (Total)	20	4	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>E. H. and J. A. Meadows, New Bern, N. C.—</i>			
Meadows' Cotton Guano.....	8	2	2
Meadows' All Crop Guano.....	8	2.50	2.50
Meadows' Roanoke Guano.....	8	2.50	3
Meadows' Gold Leaf Tobacco.....	8	3	3
Meadows' Sea Bird Guano.....	8	4	2.50
Meadows' Labos Guano.....	8	5	5
Meadows' Great Potato Guano.....	7	5	8
Meadows' Great Cabbage Guano.....	7	7	7
Meadows' 10 Per Cent Ammoniated Guano.....	6	10	2.50
Meadows' Dissolved Bone and Potash Compound....	10	..	4
Meadows' Dissolved Bone and Potash Compound....	10	..	2
Meadows' Diamond Acid Phosphate.....	14	..	..
Meadows' Genuine German Kainit.....	..	..	12

The Miller Fertilizer Co., Baltimore, Md.—

Standard Phosphate.....	8	3	3
Ammoniated Dissolved Bone.....	8	2	2
Miller's Irish Potato.....	8	4	4
Tobacco King	8	3	3
High Grade Potato.....	6	5	7
Standard Potato	8	3	3
Profit	8	2	2
Potato and Vegetable Grower.....	8	2	4
No. 1 Potato and Vegetable Grower.....	8	4.50	7
Corn and Peanut Grower.....	10.50	..	2.25
S. C. Rock.....	14	..	..
Farmers' Profit	8	2	2
Cotton Queen	8	2	1
Trucker	8	5	5
Miller's 7 Per Cent.....	7	7	7
Harmony	8	2.50	3
Clinch	10	..	2
Potato Mixture	10	..	4
4 Per Cent Tobacco.....	8	4	4
Kainit .....	..	..	12
Miller's 16 Per Cent Acid Phosphate.....	16	..	..

The MacMurphy Co., Charleston, S. C.—

Special 9-3-3 Guano.....	9	3	3
Special 8-3-3 Cotton and Corn Guano.....	8	3	3
Special 8-2-2 Cotton and Corn Guano.....	8	2	2
High Grade Acid Phosphate 16 Per Cent.....	16	..	..
High Grade Acid Phosphate 14 Per Cent.....	14	..	..
High Grade Acid Phosphate.....	13	..	..
Wilcox & Gibbs Co.'s Manipulated Guano.....	9	2.75	2
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	48
Pure German Kainit.....	12

John F. McNair, Laurinburg, N. C.—

Genuine German Kainit.....	12
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Navassa Guano Co., Wilmington, N. C.—

Navassa Cotton Fertilizer.....	8	2	2
Navassa Grain Fertilizer.....	8	2	2
Navassa Cotton-seed Meal Guano.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Navassa Fruit Growers' Fertilizer.....	8	2	6
Navassa Universal Fertilizer.....	8	2.50	1
Navassa Guano for Tobacco.....	8	2.50	2
Navassa Strawberry Top Dressing.....	8	2.50	4
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8	3	2
Navassa High Grade Guano.....	8	3	3
Navassa Complete Fertilizer.....	8	2	1
Navassa Blood and Meal Mixture.....	8	3	5
Navassa Carib Guano.....	8	3	10
Navassa Special Truck Guano.....	8	4	4
Navassa Creole Guano.....	6	5	7
Navassa Root Crop Fertilizer.....	7	5	7
Navassa Bone and Potash.....	8.50	..	2
Navassa Acid Phosphate with Potash.....	10	..	1
Navassa Dissolved Bone with Potash.....	10	..	2
Navassa Wheat Mixture.....	10	..	2.25
Navassa Wheat and Grass Grower.....	10	..	4
Navassa Gray Land Mixture.....	12	..	4
Navassa Special Wheat Mixture.....	12	..	4
Navassa Acid Phosphate	12	..	..
Navassa High Grade Dissolved Bone.....	13	..	..
Navassa 14 Per Cent Acid Phosphate.....	14	..	..
Navassa 16 Per Cent Acid Phosphate.....	16	..	..
Occoneechee Tobacco Guano.....	8	2	2
Harvest King Guano.....	8	2	3
Croatan Acid Phosphate.....	10	..	..
Harvey's Bone and Potash Mixture.....	8	..	3
Warlick's Mixture	8	..	2.25
Coree Tobacco Guano.....	8	4	4
Orton Guano	8	3	4
Clarendon Tobacco Guano.....	8	3	3
Mogul Guano	8	2.50	3
Ammoniated Soluble Navassa Guano.....	8	2.50	2
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Nitrate of Soda.....	..	18	..
<i>N. C. Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8	2.75	2
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
Pamlico Electric Top Dresser.....	5	10	2.50
Dunn's Standard Truck Grower.....	7	7	7
Ives' Irish Potato Guano.....	7	5	7
Craven Bright Tobacco Guano.....	8	3	3
Lenoir Bright Leaf Tobacco Grower.....	8	3	3
Craven Cotton Guano.....	8	2	2
Pitt's Prolific Golden Tobacco Guano.....	8	3	3
Foy's High Grade Fertilizer.....	8	3	3
Onslow Farmers' Reliance Guano.....	8	2.50	3
Jones County Premium Crop Grower.....	8	2.50	3
Green County Standard Fertilizer.....	8	2	2
Carteret Bone and Potash.....	10	..	2
14 Per Cent Acid Phosphate.....	14	..	..
Pot. Neck Tobacco Guano.....	8	4	4
High Grade Fertilizer.....	8	3	3
Bogue Fish Scrap.....	4	9	..
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Oriole Tobacco Grower.....	8	4	4
<i>Norfolk Fertilizer Co., Norfolk, Va.—</i>			
Oriano Tobacco Guano.....	8	3	3
Oriano Cotton Guano.....	8	2	2
Oriano 3-8-3 for Cotton.....	8	3	3
Oriano Crop Grower.....	8	3	3
Oriano C. S. M. Special.....	9	2.75	2
Oriano Bone and Potash.....	10	..	2
Oriano 14 Per Cent Acid Phosphate.....	14	..	..
Oriano 16 Per Cent Acid Phosphate.....	16	..	..
Genuine German Kainit.....	..	..	12
<i>G. Ober & Sons Co., Baltimore, Md.—</i>			
Ober's Dissolved Bone Phosphate.....	14	..	..
Ober's Dissolved Bone Phosphate and Potash.....	10	..	2
Ober's Acid Phosphate with Potash.....	8	..	4
Ober's Complete Fertilizer.....	6	5	6
Ober's Special Compound for Tobacco.....	8	3	3
Ober's Standard Tobacco Fertilizer.....	8	2	2
Ober's Special High Grade Fertilizer.....	9	3	3
Ober's Special Ammoniated Dissolved Bone.....	9	2	2
Ober's Special Cotton Compound.....	8	2	2
Kainit .....	..	..	12
Ober's Nitrate of Soda.....	..	18	..
Ober's Muriate of Potash.....	..	..	48
Ober's High Grade Acid Phosphate.....	16	..	..
Cooper's Pungo Guano.....	8	2.50	2
<i>The Pocomoke Guano Co., Norfolk, Va.—</i>			
Superb Acid Phosphate 16 Per Cent.....	16	..	..
10-2 Potash Mixture.....	10	..	2
Pocomoke Bone and Potash Mixture.....	10	..	4
Pocomoke Superphosphate.....	8.50	2	2
Cinco Tobacco Guano.....	8.50	2.50	2.50
Monarch Tobacco Grower.....	8	3	3
Monticello Animal Bone Fertilizer.....	9	2.25	4
Crescent Complete Compound.....	8	2	3
L. P. H. Premium.....	8	2	2
Hornthal Tobacco Guano.....	8	2	3
Electric Crop Grower.....	8.50	2	2
Peerless Acid Phosphate.....	14	..	..
Pamlico Superphosphate.....	8	2	2
Alkali Bone	11	..	2
Harvey's High Grade Monarch.....	8	3	3
Faultless Ammoniated Superphosphate.....	7	4	4
Seaboard Popular Trucker.....	6	7	5
Standard Truck Guano.....	7	5	5
Freeman's 7 Per Cent Irish Potato Grower.....	6	7	5
Coast Line	5	10	3
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Pure Ground Bone..... (Total)	20	4.50	..
Nitrate of Soda.....	..	19	..
Faultless Ammoniated Superphosphate.....	7	4	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Pacific Guano Co., Boston, Mass., and Charleston, S. C.—</i>			
Soluble Pacific Guano	8.50	2	2
Pacific Special High Grade Fertilizer.....	8	3	3
Pacific Acid Phosphate.....	12	..	..
<i>Pocahontas Guano Co., Lynchburg, Va.—</i>			
Pocahontas Special Tobacco Fertilizer.....	9	3	3
Standard Tobacco Guano (Old Chief Brand).....	9	2	2
H. G. 4 Per Cent Tobacco Compound (Mohawk King).....	9	2.25	4
Spot Cash Tobacco Compound.....	8	2.50	3
Yellow Tobacco Special.....	9	2	2
Wabash Wheat Mixture.....	10	..	4
Cherokee Grain Special.....	8	..	4
Imperial Dissolved S. C. Phosphate.....	14	..	..
Farmers' Favorite (Apex Brand).....	8	3	3
Cherokee Cotton Grower.....	9	2	2
Black Hawk Brand.....	8	2.50	2
Red Bear Special.....	8	2.50	3
Indian Truck Grower.....	8	4	4
Big Joe Brand.....	8	2	1
Carrington's Superior Grain Compound.....	10	..	2
Carrington's Banner Brand Guano.....	8	2	2
Carrington's S. C. Phosphate (Waukesha Brand)...	16	..	..
Carrington's Superior Grain Compound No. 3.....	10	..	3
Carrington's Special Truck (Eagle Mt. Brand)....	8	2.50	6
Pure Raw Bone Meal..... (Total)	22	4.50	..
<i>Patapsco Guano Co., Baltimore, Md.—</i>			
Patapsco Special Tobacco Mixture.....	8	2.50	3
Unicorn Guano	8	2.50	3
Pilot Guano Special 4 Per Cent.....	10	2.50	4
Money Maker Guano.....	7	4.50	6
Patapsco Guano	9.25	2.50	2
Patapsco Guano for Tobacco.....	9.25	2.50	2
Patapsco Tobacco Fertilizer.....	9	3	3
Patapsco Trucker for Early Vegetables.....	7	5	5
Patapsco Crop Dresser.....	4	4	4
Patapsco Potato Guano.....	6	5	7
Patapsco 7-7-7 Truck Guano.....	7	7	7
Patapsco 10-4 Potash Mixture.....	10	..	4
Patapsco High Grade Bone and Potash.....	11	..	5
Patapsco Soluble Bone and Potash.....	10	..	2
Patapsco Dissolved S. C. Phosphate.....	14	..	..
Choctaw Guano	8	3	3
Planters' Favorite	8	2	2
Sea Gull Ammoniated Guano.....	8	2	2
Baltimore Soluble Phosphate.....	11	..	2
Florida Soluble Phosphate.....	16	..	..
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
<i>Planters Fertilizer and Phosphate Co., Charleston, S. C.—</i>			
Planters' Blood, Bone and Potash.	8	2.50	1
Planters' High Grade Acid Phosphate.....	14	..	..
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	18	..
Planters' Special Truck.....	8	3	10

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Z. V. Pate, Laurel Hill, N. C.—</i>			
Nitrate of Soda .....	..	18	..
<i>Parker & Hunt, Oxford, N. C.—</i>			
Parker & Hunt's Special	8	2	2
<i>Pitt County Oil Co., Winterville, N. C.—</i>			
Cotton-Seed Meal .....	..	7.50	..
<i>Peoples Cotton Oil Co., Selma, Ala.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Powhatan Chemical Co., Richmond, Va.—</i>			
Powhatan Trucker	7	6	5
North State Special	8	4	4
P. C. Co.'s Hustler	8	3	3
Economic Cotton Grower	9	2.75	2
White Leaf Tobacco Fertilizer	8	2.50	3
King Brand Fertilizer	8	2.50	3
Magic Tobacco Grower	8	2	2
Magic Special Fertilizer	8	2	2
Magic Cotton Grower	8	2	2
Magic Mixture	8	2	1
Guilford's Special Tobacco Fertilizer	9	3	6
Magic Bone and Potash Mixture	10	..	4
Powhatan Bone and Potash Mixture	8	..	4
Magic Grain and Grass Grower	8	..	4
Magic Peanut Grower	8	..	4
Bone and Potash Mixture	10	..	2
Dixie Grain and Grass Grower	8	..	2
Magic Dissolved Bone Phosphate	16	..	..
Unedda Acid Phosphate	15	..	..
High Grade Acid Phosphate	14	..	..
Powhatan Acid Phosphate	13	..	..
Virginia Dissolved Bone	12	..	..
Magic S. C. Phosphate	10	..	..
Bone Meal	(Total) 25	3	..
Pure Raw Bone Meal	(Total) 20	4	..
Pure German Kainit .....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..
<i>Piedmont-Mt. Airy Guano Co., Baltimore, Md.—</i>			
Privott's Standard Guano	8	2.50	3
Privott's Special for Potatoes and Vegetables	8	2	6
Piedmont High Grade Ammoniated Bone and Potash	8	3	3
Piedmont Farmers' High Grade Bone and Potash	10	..	2
Piedmont Special Farmers' Tobacco Guano	8	3	4
Piedmont Guano for Tobacco	8	2.50	3
Piedmont High Grade S. C. Bone Phosphate	14	..	..
Piedmont Special for Cotton, Corn and Peanuts	8	2	2
Piedmont Early Vegetable Manure	6	5	7
Piedmont Cultivator Brand	8	2	2
Piedmont Bone and Peruvian Mixture	8	2	2
Piedmont Special Truck Fertilizer	6	7	5

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Piedmont Essential Tobacco Compound	9	2	2
Piedmont Soluble Bone and Potash	8	..	2
Privott's 3-8-4 Guano	8	3	4
Levering's Potash Bone.....	10	..	4
Levering's Reliable Tobacco Guano	8	3	3
Genuine German Kainit .....	..	..	12
Nitrate of Soda .....	..	18.50	..
Muriate of Potash.....	..	..	50
Stowe Boss Select	8	4	4
Piedmont Vegetable Compounds.....	6	4	8
Piedmont Farmers' Standard	9	2	2
<i>Parson & Hall, Wadesboro, N. C.—</i>			
German Kainit .....	..	..	11
<i>Pine Level Oil Mills, Pine Level, N. C.—</i>			
Hale's Special for Tobacco.....	8	3	4
Pine Level High Grade Guano.....	8	3	3
<i>The Quinnipiac Co., New York, N. Y., Charleston, S. C.—</i>			
Quinnipiac Pine Island Ammoniated Superphosphate	9	2.25	1
Quinnipiac Acid Phosphate.....	13	..	..
<i>F. S. Royster Guano Co., Norfolk, Va.—</i>			
Marlboro H. G. Cotton Grower	8	3	3
Bonanza Tobacco Guano	8	3	3
Farmers' Bone Fertilizer	8	2	2
Special Compound	8	2	1
Caledonia Compound	8	2	1
Arrow Brand Guano	8	2.50	1
Royster's Meal Mixture	9	2.75	2
Orinoco Tobacco Guano.....	8	2.50	3
Special Tobacco Compound	8	2.50	2
Cobb's High Grade for Tobacco	8	5	6
Royster's Special 10 Per Cent Truck Guano.....	5	10	3
Royster's Early Truck Guano	7	5	8
Royster's Special 7 Per Cent Truck Guano	7	7	7
Trucker's Delight	8	4	4
Royal Potato Guano	7	5	5
Royal Special Potato Guano	7	5	7
Ballentine's Potato Guano	6	7	7
Royster's Special Sweet Potato Guano	8	3	3
Tomlinson's Special	9	3	5
Royster's Special 4-8-3	8	4	3
Royster's Special Wheat Fertilizer	8	2	2
Royster's Best Guano	8	4.50	7
Royster's Complete Guano	8	2	2
Royster's Special	8	4	3
Humphrey's Special for Tobacco.....	6	3.10	3.20
Harvey's Cabbage Guano	5	8	3
Royster's 4-9-5 Special	9	4	5
Williams' Special Guano	8	2.50	5
Magic Top Dresser.....	..	9	2.50
Royster's Peanut Special	7	..	5
Royster's Bone and Potash Mixture	10	..	2
Royster's 8-2 Bone and Potash Mixture.....	8	..	2
Royster's 10-4 Bone and Potash Mixture.....	10	..	4
Royster's 8-4 Bone and Potash Mixture.....	8	..	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Royster's 8-2.25 Bone and Potash Mixture.....	8	..	2.25
Royster's Bone and Potash for Grain.....	10	..	3
Royster's H. G. Dissolved Bone.....	13	..	..
Royster's 14 Per Cent Acid Phosphate.....	14	..	..
Royster's XX Acid Phosphate.....	12	..	..
Royster's H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Genuine German Kainit .....	..	..	12
Muriate of Potash .....	..	..	48
Sulphate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Cotton-seed Meal .....	..	7.50	..
Eagle's Special Tobacco Guano.....	8	3	5
Royster's Bone and Potash Mixture.....	11	..	5
Royster's Potato Guano	5	6	7
Royster's 2-6-5 Special	6	2	5

Read Phosphate Co., Charleston, S. C.—

Read's Special Potash Mixture.....	8	..	4
Read's High Grade Tobacco Leaf	8	3	3
Read's Bone and Potash	10	..	4
Read's Cotton Flower	8	2.50	1
Read's Blood and Bone Fertilizer No. 1.....	8	2	2
Read's Soluble Fish Guano	8	2	2
Read's High Grade Manipulated.....	9	2	3
Read's High Grade Dissolved Bone	14	..	..
Read's High Grade Cotton Grower	8	3	3
Read's High Grade Acid Phosphate	13	..	..
Read's Alkaline Bone.....	10	..	2
Genuine German Kainit .....	..	..	12

Richmond Guano Co., Richmond, Va.—

Perfection Special	8	4	4
Southern Trucker	8	5	5
Special High Grade for Truck.....	7	6	5
10 Per Cent Cabbage Guano.....	6	10	2
Gilt-edge Fertilizer	8	3	3
Carolina Cotton Grower	9	2.75	2
Carolina Bright Special Tobacco Fertilizer.....	8	2.75	2.50
Tip Top Fertilizer	8	2.50	3
Special Premium Brand for Tobacco.....	8	2.25	2.25
Special Premium Brand for Plants	8	2.25	2.25
Carolina Bright for Cotton	8	2.50	1.50
Premium Tobacco Fertilizer	8	2	2
Premium Brand Fertilizer	8	2	2
Bone Mixture	8	2	1
Clark's Special Formula	7	6	6
Carter's Special Tobacco Fertilizer	4	3	6
Saunders' Special Formula for Bright Tobacco....	9	3.50	5
Burton's Special Tobacco Fertilizer	9	2.50	3
Premium Bone and Potash Mixture.....	13	..	3
Rex Bone and Potash Mixture	10	..	4
Tip-Top Bone and Potash Mixture.....	8	..	4
Winter Grain and Grass Grower	8	..	4
Premium Peanut Grower	8	..	4
Bone and Potash Mixture.....	10	..	2
Premium Grain and Grass Grower	8	..	2
Rex Dissolved Bone Phosphate	16	..	2
Regal Acid Phosphate.....	15	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
High Grade Acid Phosphate	14	..	..
High Grade Wheat and Grass Fertilizer.....	14	..	..
Premium Dissolved Bone	13	..	..
Dissolved S. C. Phosphate	12	..	..
Old Homestead Dissolved Bone	10	..	..
Edgecombe Cotton Grower	8	2	2
Hunter & Dunn's Dissolved Bone.....	13	..	..
Hunter & Dunn's Ammoniated Fertilizer.....	8	2	2
Hunter & Dunn's Special Ammoniated Fertilizer....	9	3	2.25
Bone Meal	25	3	..
Pure Raw Bone Meal	20	4	..
Pure German Kainit .....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..
Beeson's Special Fertilizer.....	8	2	6
<i>Reidsville Fertilizer Co., Reidsville, N. C.—</i>			
Banner Fertilizer	8	2	1
Champion Guano	8	2	2
Lion Brand Fertilizer	9	3	6
Broad Leaf Tobacco Guano.....	9	2.25	2.50
Royal Fertilizer	8	3	3
Bone and Potash 10-4.....	10	..	4
Bone and Potash 8-2.....	8	..	2
<i>Rasin-Monumental Co., Baltimore, Md.—</i>			
Rasin Bone and Potash	10	..	2
Rasin Special Bone and Potash.....	10	..	5
Rasin Empire Guano	8	2	2
Rasin Dixie Guano	8	2	1
Rasin Gold Standard Guano.....	8	3	3
Rasin 13 Per Cent Acid Phosphate.....	13	..	..
Rasin 16 Per Cent Acid Phosphate.....	16	..	..
Rasin Acid Phosphate	14	..	..
<i>J. H. Roberson & Co., Robersonville, N. C.—</i>			
Roberson's Cotton Grower	9	2.75	2
Roberson's Potato Grower	6	7	5
Roberson's Special Potato Grower.....	7	7	7
Roberson's Bright Leaf Grower	8	2.50	3
Roberson's High Grade Acid Phosphate	14	..	..
Genuine German Kainit .....	..	..	12
<i>Swift Fertilizer Works, Atlanta, Ga.—</i>			
Swift's Blood, Bone, and Potash H. G. Guano.....	9.25	4	7
Swift's Corn and Cotton Grower H. G. Guano.....	10	3	3
Special High Grade Guano	9.25	5	3
Swift's Monarch High Grade Guano.....	8	4	4
Swift's Cotton King High Grade Guano.....	9	3	2
Swift's Farmers' Home High Grade Guano.....	9	2	3
Swift's Pioneer High Grade Tobacco Grower.....	8	2	4
Swift's Golden Harvest Standard Grade Guano....	8	2	2
Swift's Eagle High Grade Guano.....	10	2	2
Swift's Red Steer Standard Grade Guano	8	2	2
Swift's Cotton Plant Standard Grade Guano.....	8	2	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Swift's Rivalist High Grade Guano.....	8	3	3
Swift's Special High Grade Phosphate and Potash..	12	..	6
Swift's Atlanta High Grade Phosphate and Potash..	12	..	4
Swift's Farmers' Home H. G. Phosphate and Potash	10	..	4
Swift's Plantation Standard Grade Phosphate and Potash	8	..	4
Swift's Wheat Grower Standard Grade Phosphate and Potash	10	..	2
Swift's Field and Farm Standard Grade Phosphate and Potash	10	..	2
Swift's Special High Grade Acid Phosphate.....	16	..	..
Swift's Cultivator High Grade Acid Phosphate....	14	..	..
Swift's Harrow High Grade Acid Phosphate.....	13	..	..
Swift's Chattahoochee Standard Grade Acid Phos- phate	12	..	..
Swift's German Kainit.....	..	..	12
Swift's Pure Nitrate of Soda.....	..	18	..
Swift's Muriate of Potash.....	..	..	50
<i>Swift & Co., Chicago, Ill.—</i>			
Swift's Pure Raw Bone Meal..... (Total)	23	4	..
Swift's No. 1 Ground Tankage.....	6	10	..
Swift's Pure Bone Meal.....	25	3	..
Swift's Ground Dried Blood.....	..	16	..
<i>South Atlantic Oil Co., Wadesboro, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>The Southern Exchange Co., Maxton, N. C.—</i>			
The Coon Guano.....	8	2	2
The Racer Guano.....	8	2	3
The Walnut Fertilizer.....	8.50	2.50	2.50
Juicy Fruit Fertilizer.....	9	2.25	4
R. M. C. Special Crop Grower.....	8	3	3
Correct Cotton Compound.....	8	3	3
Jack's Best Fertilizer.....	8	3	3
Bull of the Woods Fertilizer.....	8	3	4
That Big Stick Guano.....	8	3	4
Two Fours Guano.....	7	4	4
S. E. C. Acid Phosphate.....	16	..	..
Acid Phosphate	14	..	..
McKimmon's Special Truck Formula.....	8	5	7
Melon Grower	8	5	7
S. E. C. Bone and Potash Mixture.....	10	..	4
Bone and Potash Mixture.....	10	..	2
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
<i>Southern Cotton Oil Co., Charlotte, Concord, Davidson, Gastonia, Shelby, Monroe, N. C.—</i>			
Peacock	8	3	3
Conqueror	8	4	4
Red Bull	8	2.50	2
Moon	8	3	3
King Bee	8.65	2	2
Magnolia	8.65	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Gloria	8	2	2
First Call	8	2.50	1
Gold Seal	14	..	..
Sunrise	8	2.50	1
Silver King	13	..	..
Conqueror Bone and Potash.....	10	..	4
Magnolia Bone and Potash.....	10	..	2
Genuine German Kainit.....	..	..	12

*Southern Cotton Oil Co., Goldsboro, Fayetteville, Wilson
and Rocky Mount, N. C.—*

Best & Thompson's Special Cotton Grower.....	9	2.75	2
Southern Cotton Oil Co.'s High Grade.....	8	2.75	2.50
Edgerton's Old Reliable	8	3	3
Rocky Mount Oil Mill's Special Cotton Grower....	8	3	3
Rocky Mount Oil Mill's Standard	8	2	2
Rocky Mount Oil Mill's Special Cotton Grower....	8	3	3
Goldsboro Oil Mill's High Grade.....	8	2.75	2
Goldsboro Oil Mill's Special Cotton Grower.....	8	3	3
Goldsboro Oil Mill's Standard	8	2	2

Southern Chemical Co., Inc., Roanoke, Va.—

Our Favorite	8	2	2
Pride of Virginia.....	8	2	3
Farmers' Joy	8	2	4

Tuscarora Fertilizer Co., Baltimore, Md.—

13 Per Cent Acid Phosphate.....	13	..	..
Acid Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Bone and Potash.....	10	..	2
Alkaline	10	..	5
Manure Substitute	6	4	4
Big Four	7	2	4
Standard	8	2	2
Fruit and Potato.....	8	2	10
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Tobacco Special	8	3	3
Cotton Special	8	3	3
Special Trucker	8	4	4
Tuscarora Trucker	8	5	7
Animal Bone	(Total) 24	3	..
Raw Bone Meal.....	(Total) 22	4.50	..
Sulphate of Potash .....	..	..	50
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Kainit .....	..	..	12

R. L. Upshur, Norfolk, Va.—

Upshur's Fish Bone and Potash Guano.....	8	2	4
Upshur's 5 Per Cent Guano.....	5	5	5
Upshur's 3-8-3 Cotton Guano.....	8	3	3
Upshur's Peanut Guano.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Upshur's G. G. and C. (Grain, Grass and Cotton) Guano	8	2	2
Upshur's Special Truck Guano.....	7	5	8
Upshur's 7 Per Cent Special Potato Guano.....	5	7	5
Upshur's 7 Per Cent Irish Potato Guano.....	6	7	5
Upshur's F. C. (Farmers' Challenge) Guano.....	6	7	6
Upshur's F. F. (Farmers' Favorite) Guano.....	7	5	6
Premo Cotton Guano.....	8	2	1.50
Upshur's Bone and Potash Guano.....	10	..	2
Upshur's High Grade Acid Phosphate.....	14	..	..
Upshur's High Grade Guano.....	8	3	3
Cotton-seed Meal Mixture.....	9	2.75	2
Genuine German Kainit.....	..	..	12

Union Guano Co., Winston, N. C.—

Union Potato Manure.....	8	2	1
Union Approved Crop Grower.....	8.65	2	2
Union Truck Guano.....	7	4	5
Union Perfect Cotton Grower.....	9	2.75	2
Union Mule Brand Guano.....	10	2	2
Union Waterfowl Guano.....	8	2.50	3
Union Homestead Guano.....	8	3	3
Union Standard Tobacco Grower.....	8	2.50	2
Union Premium Guano.....	8	4	4
Union Vegetable Compound.....	7	5	8
Union 10-4 Bone and Potash.....	10	..	4
Union Wheat Mixture.....	8	..	4
Union Bone and Potash.....	10	..	2
Union 10-6 Bone and Potash.....	10	..	6
Union 10-5 Bone and Potash.....	10	..	5
Union 12-3 Bone and Potash.....	12	..	3
Union 12-4 Bone and Potash.....	12	..	4
Union 12-5 Bone and Potash.....	12	..	5
Union 12-6 Bone and Potash.....	12	..	6
Union 16 Per Cent Acid Phosphate.....	16	..	..
Union High Grade Acid Phosphate.....	14	..	..
Union Dissolved Bone.....	13	..	..
Union 12 Per Cent Acid Phosphate.....	12	..	..
Union 10 Per Cent Acid Phosphate.....	10	..	..
Giant Phosphate and Potash.....	10	..	3
Sunrise Soluble Bone and Potash.....	8	..	2.25
Liberty Bell Crop Grower	10	..	1.50
Rockingham Bone and Potash.....	8.50	..	2
Roseboro's Special Potash Mixture.....	12	..	6
Old Honesty Guano.....	8	2	2
Victoria High Grade Tobacco Guano.....	8	3	3
Vulcan Ammoniated Guano.....	8	2.50	1
Quaker Grain Mixture.....	10	..	4
Q. and Q. (Quantity and Quality) Guano.....	8	2	1
Genuine German Kainit.....	..	..	12
Murray's Potash Mixture.....	8	..	2.25
Murray's Special Crop Grower.....	8	2	2
Cotton-seed Meal .....	..	7.50	..
Union Special Formula for Cotton.....	10	3	3
Union Complete Cotton Mixture.....	9	2	3

Name and Address of Manufacturer and Name of Brand.	Avail Phos. Acid.	Am- monia.	Potash.
<i>Venable Fertilizer Co., Richmond, Va.—</i>			
Venable's 10 Per Cent Trucker.....	6	10	2
Venable's 6-6-6 Manure.....	6	6	6
Venable's 5 Per Cent Trucker.....	8	5	5
Venable's 4 Per Cent Trucker.....	8	4	4
Venable's Ideal Manure.....	8	2	5
Venable's Roanoke Special.....	8	2.50	3
Venable's Dissolved Bone Phosphate.....	13	..	..
Venable's S. C. Bone.....	10	..	..
Venable's B. B. P. Manure.....	8	2	1
Venable's Alliance Bone and Potash Mixture.....	8	..	4
Venable's Peanut Grower.....	8	..	4
Venable's Grain and Grass Grower.....	8	..	2
Venable's Alliance Acid Phosphate.....	14	..	..
Planters' Bone Fertilizer.....	8	2	2
Bone and Potash Mixture.....	10	..	2
High Grade Bone and Potash Mixture.....	10	..	4
Pure Raw Bone Meal..... (Total)	20	4	..
Bone Meal (Total)	25	3	..
Pure German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
Nitrate of Soda.....	..	19	..
Venable's Cotton Grower.....	8	2.50	3
Venable's Roanoke Mixture.....	9	2.75	2

Virginia-Carolina Chemical Co., Richmond, Va.—

V. C. C. Co.'s Solid South.....	8	..	2.25
V. C. C. Co.'s 14 Per Cent Acid Phosphate.....	14	..	..
V. C. C. Co.'s 16 Per Cent Acid Phosphate.....	16	..	..
V. C. C. Co.'s Standard Bone and Potash.....	10	..	5
V. C. C. Co.'s Special Crop Grower.....	12	..	3
V. C. C. Co.'s Formula 44.....	7	3.10	3.20
V. C. C. Co.'s Special Truck Guano.....	6	5	7
V. C. C. Co.'s Special.....	8	4	4
V. C. C. Co.'s Special Potash Mixture.....	10	..	4
V. C. C. Co.'s High Grade Tobacco Fertilizer.....	8	3	10
V. C. C. Co.'s Invincible High Grade Fertilizer.....	6	5	7
V. C. C. Co.'s Lion High Grade Tobacco Fertilizer..	8	3	4
V. C. C. Co.'s Great Texas Cotton Grower Soluble Guano	9	3	4
Cock's Soluble High Grade Animal Bone.....	9	2.25	3
Truck Crop Fertilizer.....	7	5	7
Cotton Grower	9	2.75	2
Battle's Crop Grower.....	12	..	3
3 Per Cent Special C. S. M. Guano No. 3.....	8	3	2
Sludge Acid Phosphate.....	14	..	..
Delta C. S. M.....	8	2.75	2.50
Winston Special for Cotton C. S. M.....	8	2	2
Diamond Dust C. S. M.....	8	2	2
Admiral	8	3	2.50
Blue Star C. S. M.....	8	2.50	3
Good Luck C. S. M.....	8	3	2.50
North State Guano C. S. M.....	8	2	1
Plant Food	8	2	2
Prolific Cotton Grower C. S. M.....	9	2.75	2
Split Silk C. S. M.....	8	3	2.50
Superlative Guano C. S. M.....	8	2.50	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Farmers' Friend Favorite Fertilizer Special.....	8.50	2	2
White Stem C. S. M.....	9	2.75	2
Special High Grade Tobacco Fertilizer C. S. M.....	8	3	3
Wilson Standard C. S. M.....	8	2	2
Adams' Special	8	3	3
Ajax C. S. M.....	8	2	2
Royal Crown	8	2.75	2
Farmers' Favorite Fertilizer C. S. M.....	8	2	2
Atlas Guano C. S. M.....	8	3	2.50
Blake's Best	8	3	3
Orange Grove	8	2.75	2.50
Genuine German Kainit.....	..	..	12
Cotton-seed Meal .....	..	7.50	..
Nitrate of Soda.....	..	19	..
Fish Scrap .....	..	10	..
Raw Bone Meal..... (Total)	20	4	..
Sulphate of Ammonia.....	..	25	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Manure Salts .....	..	..	50
Carr's 8-4-4 Crop Grower.....	8	4	4
Allison & Addison's Rockett's Acid Phosphate.....	10	..	..
Allison & Addison's Standard Acid Phosphate.....	12	..	..
Allison & Addison's I. X. L. Acid Phosphate.....	13	..	..
Allison & Addison's Fulton Acid Phosphate.....	14	..	2.25
Allison & Addison's McGavock's Spl. Potash Mixture.....	8	..	..
Allison & Addison's B. P. Potash Mixture.....	10	..	2
Allison & Addison's Old Hickory Guano.....	8	2	2
Allison & Addison's A A.....	8	3	3
Allison & Addison's Anchor Brand Fertilizer.....	8	2	2
Allison & Addison's Anchor Brand Tobacco Fertilizer.....	8.50	2.75	2
Allison & Addison's Star Brand Spl. Tobacco Manure.....	9	2.75	2
Allison & Addison's Star Brand Guano.....	8	2	1
Allison & Addison's Star Brand Vegetable Guano....	8	4.50	4
Atlantic & Va. Fert. Co.'s Our Acid Phosphate.....	12	..	..
Atlantic & Va. Fert. Co.'s Valley of Va. Phosphate..	14	..	..
Atlantic & Va. Fert. Co.'s Eureka Acid Phosphate..	10	..	..
Atlantic & Va. Fert. Co.'s Crenshaw's Acid Phos- phate	13	..	..
Atlantic & Va. Fert. Co.'s Eureka Bone and Potash Compound	10	..	2
Atlantic & Va. Fert. Co.'s Carolina Truckers'.....	7	7	7
Atlantic & Va. Fert. Co.'s Orient Spl. for Tobacco..	8	2	2
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone.....	8	2	2
Atlantic & Va. Fert. Co.'s Virginia Truckers'.....	8	5	5
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9	2.50	2
Atlantic & Va. Fert. Co.'s Orient Complete Manure..	8	2	1
Charlotte Oil & Fert. Co.'s Catawba Acid Phosphate.....	10	..	..
Charlotte Oil & Fert. Co.'s Charlotte Dissolved Bone.....	12	..	..
Charlotte Oil & Fert. Co.'s Charlotte 15 Per Cent Acid Phosphate	15	..	..
Charlotte Oil & Fert. Co.'s Charlotte Acid Phosphate.....	13	..	..
Charlotte Oil & Fert. Co.'s Charlotte Ten-Two Bone and Potash	10	..	2
Charlotte Oil & Fert. Co.'s Oliver's Perfect Wheat Grower	11	3	4
Charlotte Oil & Fert. Co.'s McCrary's Diamond Bone and Potash	8	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Charlotte Oil & Fert. Co.'s Catawba Guano B. G....	8	2	1
Charlotte Oil & Fert. Co.'s Queen of the Harvest C. S. M.....	8	2	1
Charlotte Oil & Fert. Co.'s Special 3 Per Cent Guano C. S. M.....	8	3	2
Charlotte Oil & Fert. Co.'s High Grade Special Tobacco Fertilizer	9	2.50	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Bone B. G.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Groom's Special Tobacco Fertilizer	8	3	3
Charlotte Oil & Fert. Co.'s King Cotton Grower.....	8	2	2
Charlotte Oil & Fert. Co.'s The Leader B. G.....	8	2	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano B. G.....	8	2.50	1.50
Davie & Whittle's Owl Brand Dissolved Bone.....	12	..	..
Davie & Whittle's Owl Brand Acid Phosphate.....	10	..	..
Davie & Whittle's Owl Brand H. G. Acid Phosphate..	13	..	..
Davie & Whittle's Owl Brand H. G. Dissolved Bone..	14	..	..
Davie & Whittle's Owl Brand Acid Phosphate with Potash	10	..	2
Davie & Whittle's Owl Brand Guano.....	8	2	2
Davie & Whittle's Owl Brand Guano No. 2.....	8	2	1
Davie & Whittle's Owl Brand Truck Guano.....	8	6	5
Davie & Whittle's Owl Brand Special Tobacco Guano..	9	2.50	2
Davie & Whittle's Owl Brand Guano for Tobacco...	8	3	3
Davie & Whittle's Owl Brand Vinco Guano.....	8	2	1
Durham Fert. Co.'s Durham Acid Phosphate.....	10	..	..
Durham Fert. Co.'s Durham H. G. Acid Phosphate..	13	..	..
Durham Fert. Co.'s Durham Bone and Potash Mix- ture	10	..	2
Durham Fert. Co.'s Durham Ammoniated Fertilizer..	8	2	1
Durham Fert. Co.'s N. C. Farmers' Alliance Official Acid Phosphate	13	..	..
Durham Fert. Co.'s Blacksburg Dissolved Bone.....	13	..	..
Durham Fert. Co.'s Raw Bone Superphosphate for Tobacco	8	2.50	2
Durham Fert. Co.'s Genuine Bone and Peruvian Guano for Tobacco.....	8	2	2
Durham Fert. Co.'s Raw Bone Superphosphate.....	8	2.50	1.50
Durham Fert. Co.'s Gold Medal Brand Guano.....	8	3	3
Durham Fert. Co.'s Genuine Bone and Peruvian Guano	8	2	2
Durham Fert. Co.'s N. C. Farmers' Alliance Official Guano	8	2.50	3
Durham Fert. Co.'s Golden Leaf Bright Tobacco Guano	8	3	3
Durham Fert. Co.'s Spl. Plant and Truck Fertilizer..	8	5	3
Durham Fert. Co.'s Progressive Farmer Guano.....	8	2	1
Durham Fert. Co.'s L. & N. Special.....	9	3	2
Durham Fert. Co.'s Best Potato Manure.....	7	7	7
Durham Fert. Co.'s Blacksburg Soluble Guano.....	8	2	2
Durham Fert. Co.'s Standard Guano.....	9	2	2
Durham Fert. Co.'s Great Wheat and Corn Grower..	10	..	1.50
Durham Fert. Co.'s Carr's Special Wheat Grower..	8	..	4
Durham Fert. Co.'s Standard Wheat Grower.....	10	..	2
Durham Fert. Co.'s Blue Ridge Wheat Grower.....	10	..	2
Durham Fert. Co.'s Diamond Wheat Mixture.....	10	..	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Durham Fert. Co.'s Double Bone Phosphate.....	13	..	..
Durham Fert. Co.'s Excelsior Dis. Bone Phosphate..	14	..	..
Durham Fert. Co.'s Standard High Grade Phosphate,	13	..	..
Lynchburg Guano Co.'s Golden Age Pure Bone			
Meal (Total)	20	4	..
Lynchburg Guano Co.'s Ironside Acid Phosphate....	16	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate....	12	..	..
Lynchburg Guano Co.'s Otter Brand Acid Phosphate,	10	..	..
Lynchburg Guano Co.'s Arvonian Acid Phosphate....	13	..	..
Lynchburg Guano Co.'s Lynchburg High Grade Acid			
Phosphate	14	..	..
Lynchburg Guano Co.'s S. W. Special Bone and			
Potash Mixture	10	..	4
Lynchburg Guano Co.'s Alpine Mixture.....	10	..	5
Lynchburg Guano Co.'s Dissolved Bone and Potash..	10	..	2
Lynchburg Guano Co.'s Lynchburg Soluble for			
Tobacco	8	2	2
Lynchburg Guano Co.'s Lynchburg Soluble.....	8	2	2
Lynchburg Guano Co.'s New Era.....	8	2	1
Lynchburg Guano Co.'s Independent Standard.....	8.50	2	2
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8	2.75	4
Lynchburg Guano Co.'s Bright Belt Guano.....	8	2	..
Norfolk & Car. Chem. Co.'s Norfolk Reliable Acid			
Phosphate	10	..	..
Norfolk & Car. Chem. Co.'s Norfolk Best Acid Phos-			
phate	13	..	..
Norfolk & Car. Chem. Co.'s Norfolk Bone and Potash,	10	..	2
Norfolk & Car. Chem. Co.'s Crescent Brand Ammon-			
iated Fertilizer	8	2	1
Norfolk & Car. Chem. Co.'s Cooper's Bright Tobacco			
Fertilizer	8	2.50	3
Norfolk & Car. Chem. Co.'s Norfolk Truck and			
Tomato Grower	8	5	5
Norfolk & Car. Chem. Co.'s Pretlow's Champion			
for Peanuts, Cotton and Corn.....	8	2	1
Norfolk & Car. Chem. Co.'s Genuine Slaughter			
House Bone	8	2	2
Norfolk & Car. Chem. Co.'s Bright Leaf Tobacco			
Grower	8	3	3
Norfolk & Car. Chem. Co.'s Genuine Slaughter			
House Bone made especially for Tobacco.....	8	2.50	2
Norfolk & Car. Chem. Co.'s Amazon H. G. Manure..	8	3	3
Norfolk & Car. Chem. Co.'s Norfolk Soluble Bone...	10	..	..
Old Dominion Guano Co.'s H. G. Bone Phosphate..	13	..	..
Old Dominion Guano Co.'s Royster's High Grade			
Acid Phosphate	12	..	..
Old Dominion Guano Co.'s Planters' Bone and			
Potash Mixture	10	..	3
Old Dominion Guano Co.'s Miller's Special Wheat			
Mixture	8	..	4
Old Dominion Guano Co.'s High Grade Alkaline			
Bone and Potash.....	10	..	2
Old Dominion Guano Co.'s Dis. Bone and Potash....	8.50	..	2
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck			
Guano	6	7	5
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck			
Guano	7	7	7

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Old Dominion Guano Co.'s Isley's Formula of Dis- solved Bone Potash Chemicals.....	8	3	3
Old Dominion Guano Co.'s Bullock's Cotton Grower, Old Dominion Guano Co.'s Old Dominion Special Wheat Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6	2	2
Old Dominion Guano Co.'s Osecola Tobacco Guano..	8	2.50	3
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Soluble Guano	8	2	2
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer	8	3	3
Old Dominion Guano Co.'s Farmers' Friend Fer- tilizer	8	2	2
Old Dominion Guano Co.'s Standard Raw Bone Solu- ble Guano	8	2	1
Old Dominion Guano Co.'s Old Dominion Potato Manure	7	5	8
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer	8	3	3
Powers, Gibbs & Co.'s Fulp's H. G. Acid Phosphate..	13	..	..
Powers, Gibbs & Co.'s Cotton Brand Acid Phosphate,	12	..	..
Powers, Gibbs & Co.'s Almont H. G. Acid Phosphate,	13	..	..
Powers, Gibbs & Co.'s Almont Wheat Mixture.....	10	..	3
Powers, Gibbs & Co.'s Cotton Brand H. G. Acid Phosphate	13	..	..
Powers, Gibbs & Co.'s Acid Phosphate and Potash..	10	..	1
Powers, Gibbs & Co.'s Dissolved Bone and Potash..	10	..	2
Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano	8	3	2
Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone	8	2	1
Powers, Gibbs & Co.'s Almont Soluble Ammoniated Guano	8	2	2
Powers, Gibbs & Co.'s Carolina Golden Belt Ammo- niated Guano for Tobacco.....	8	2.50	3
Powers, Gibbs & Co.'s Eagle Island Ammo'd Guano..	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano.....	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano	9	3	2
Powers, Gibbs & Co.'s Truck Farmers' Special Am- moniated Guano	8	4	5
Powers, Gibbs & Co.'s Old Kentucky H. G. Manure..	8	3	3
Powers, Gibbs & Co.'s Gibbs' H. G. Ammo'd Guano..	8	2.50	1
Powers' H. G. Ammoniated Guano.....	8	2.50	2
Southern Chem. Co.'s Tar Heel Acid Phosphate.....	12	..	..
Southern Chem. Co.'s Horseshoe Acid Phosphate...	10	..	..
Southern Chem. Co.'s Elkin Acid Phosphate.....	12	..	..
Southern Chem. Co.'s Chatham Acid Phosphate.....	13	..	..
Southern Chem. Co.'s Click's 16 Per Cent Acid Phosphate	16	..	..
Southern Chem. Co.'s Victor H. G. Acid Phosphate..	16	..	..
Southern Chem. Co.'s Comet 16 Per Cent Acid Phosphate	16	..	..
Southern Chem. Co.'s Red Cross 14 Per Cent Acid Phosphate	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Southern Chem. Co.'s Reaper Grain Application....	12	..	3
Southern Chem. Co.'s Farmers' Pride Bone and Potash	10	..	3
Southern Chem. Co.'s Quickstep Bone and Potash...	10	..	1
Southern Chem. Co.'s Mammoth Corn Grower.....	10	..	2
Southern Chem. Co.'s Winner Grain Mixture.....	10	..	4
Southern Chem. Co.'s Winston Bone and Potash Compound	10	..	2
Southern Chem. Co.'s Mammoth Wheat and Grass Grower	10	..	2
Southern Chem. Co.'s Sun Brand Guano.....	9	2.50	5
Southern Chem. Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8	3	2.50
Southern Chem. Co.'s Yaddin Complete Fertilizer...	8	2	1
Southern Chem. Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8	2.50	3
Southern Chem. Co.'s Electric Standard Guano....	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano.....	8	2	2
Southern Chem. Co.'s Click's Spl. Wheat Compound,	8	..	4
J. G. Tinsley & Co.'s Stonewall Brand Acid Phos...	10	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate....	14	..	..
J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	13	..	..
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture	10	..	2
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower..	6	4	4
J. G. Tinsley & Co.'s Stonewall Guano.....	8	2	2
J. G. Tinsley & Co.'s Lee Brand Guano.....	8	2	2
J. G. Tinsley & Co.'s 10 Per Cent Truck Guano....	5	10	2.50
J. G. Tinsley & Co.'s Stonewall Tobacco Guano....	8	2	2
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer...	8	4	2.50
J. G. Tinsley & Co.'s Irish Potato Guano.....	6	6	6
J. G. Tinsley & Co.'s Richmond Brand Guano.....	8	2	1
J. G. Tinsley & Co.'s Killikinnick Tobacco Mixture..	8	2.50	3
J. G. Tinsley & Co.'s Champion Acid Phosphate....	10	..	..
S. W. Travers & Co.'s Capital Dissolved Bone.....	12	..	..
S. W. Travers & Co.'s Standard Dissolved S. C. Bone,	13	..	..
S. W. Travers & Co.'s Dissolved Bone Phosphate....	14	..	..
S. W. Travers & Co.'s Special Wheat Compound....	8	..	4
S. W. Travers & Co.'s Capital Bone and Potash Compound.....	10	..	2
S. W. Travers & Co.'s Beef Blood and Bone Fertilizer,	8	2	1
S. W. Travers & Co.'s Capital Cotton Fertilizer....	8	2.50	1
S. W. Travers & Co.'s Capital Truck Fertilizer....	8	4	3
S. W. Travers & Co.'s Capital Tobacco Fertilizer....	8	4	3
S. W. Travers & Co.'s National Special Tobacco Fertilizer.....	8	2	2
S. W. Travers & Co.'s National Fertilizer.....	8	2	2
Va. State Fert. Co.'s Gilt Edge Brand Pure Bone Meal..... (Total)	20	4	..
Va. State Fert. Co.'s Lurish Acid Phosphate.....	10	..	..
Va. State Fert. Co.'s Alps Brand Acid Phosphate....	12	..	..
Va. State Fert. Co.'s Clipper Brand Acid Phosphate,	13	..	..
Va. State Fert. Co.'s Bull Run Acid Phosphate....	16	..	..
Va. State Fert. Co.'s Gilt Edge Brand Acid Phosphate.....	14	..	..
Va. State Fert. Co.'s Gilt Edge Brand Dissolved Bone and Potash	8.50	..	2
Va. State Fert. Co.'s High Grade Dissolved Bone and Potash.....	10	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Va. State Fert. Co.'s Mountain Top Bone and Potash	10	..	5
Va. State Fert. Co.'s XX Potash Mixture.....	10	..	5
Va. State Fert. Co.'s Bull Dog Soluble Guano.....	8	3	3
Va. State Fert. Co.'s G. E. Special Tobacco Grower..	8	2.50	2
Va. State Fert. Co.'s Game Cock Special Tobacco....	8.50	2	2
Va. State Fert. Co.'s Battle Axe Tobacco Guano....	8	2	2
Va. State Fert. Co.'s Highland King.....	8	2	1
Va. State Fert. Co.'s No. 1 Soluble Guano.....	9	2	..
Va. State Fert. Co.'s Dunnington's Special Formula for Tobacco	8	3	3
Va. State Fert. Co.'s Austrian Tobacco Grower.....	8	2.50	2
Va. State Fert. Co.'s Va. State High Grade Tobacco Guano.....	8	2	2
Va. State Fert. Co.'s Buffalo Guano.....	8	2.50	3
Va. State Fert. Co.'s Va. State High Grade Guano..	8	2	2
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Ammon- iated Guano for Beans, Peas, Cabbage, Strawber- ries, etc.	6	7	6
S. W. Travers & Co.'s Travers' 7 Per Cent Truck Fer- tilizer.....	6	7	5
J. G. Tinsley's Special Irish Potato Guano.....	6	7	6
Durham Fert. Co.'s Standard Wheat and Corn Grower	10	..	2
L. A. Carr's Special Top Dresser.....	4	10	2
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Bone Meal.....	15.85	4.60	..
<i>Williams & Clark Fertilizer Works, New York, and Charleston, S. C.—</i>			
Americus Ammoniated Bone Superphosphate.....	8	2.25	1
<i>Winborne Guano Co., Tyner, N. C.—</i>			
Winborne 7 Per Cent Guano.....	5	7	5
Winborne 3-8-4 Guano.....	8	3	4
King's Tammany Guano.....	8	2.50	3
Farmers' Select Guano	8	2.50	3
High Grade Excelsior Guano.....	8	2	2
High Grade Eureka Guano	8	2	2
High Grade Triumph Guano	8	2	2
Soluble Bone and Potash	10	..	2
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit .....	..	..	12
Winborne's Tobacco Guano	8	3	3
Standard 16 Per Cent Acid Phosphate.....	16	..	..
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Standard Vegetable Fertilizer	8	3	3
Standard Potato Fertilizer.....	8	2	5
Standard Grain and Grass Grower	8	2	2
Standard High Grade Acid Phosphate.....	14	..	..
Standard Bone and Potash Mixture.....	10	..	2
Lawn Enricher	5	3	3
Wood's Pure Animal Bone	23	3	..
Nitrate of Soda .....	..	19	..
Standard Corn Fertilizer	8	2	1
<i>Wilson & Toomer Fertilizer Co., Jacksonville, Fla.—</i>			
Davis' Truck Grower Special.....	6	5	5

THE BULLETIN

OF THE

North Carolina Department of Agriculture.

THE SAN JOSE SCALE AND REMEDIES.

BY

FRANKLIN SHERMAN, Jr.

ENTOMOLOGIST.

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HEADED-BACK PEACH TREE IN FRUIT.

The sixth successive crop of peaches in a scale-infested orchard, showing that fruit-growing may be profitably carried on in spite of the San Jose Scale. (Original).

MAY, 1907

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION.

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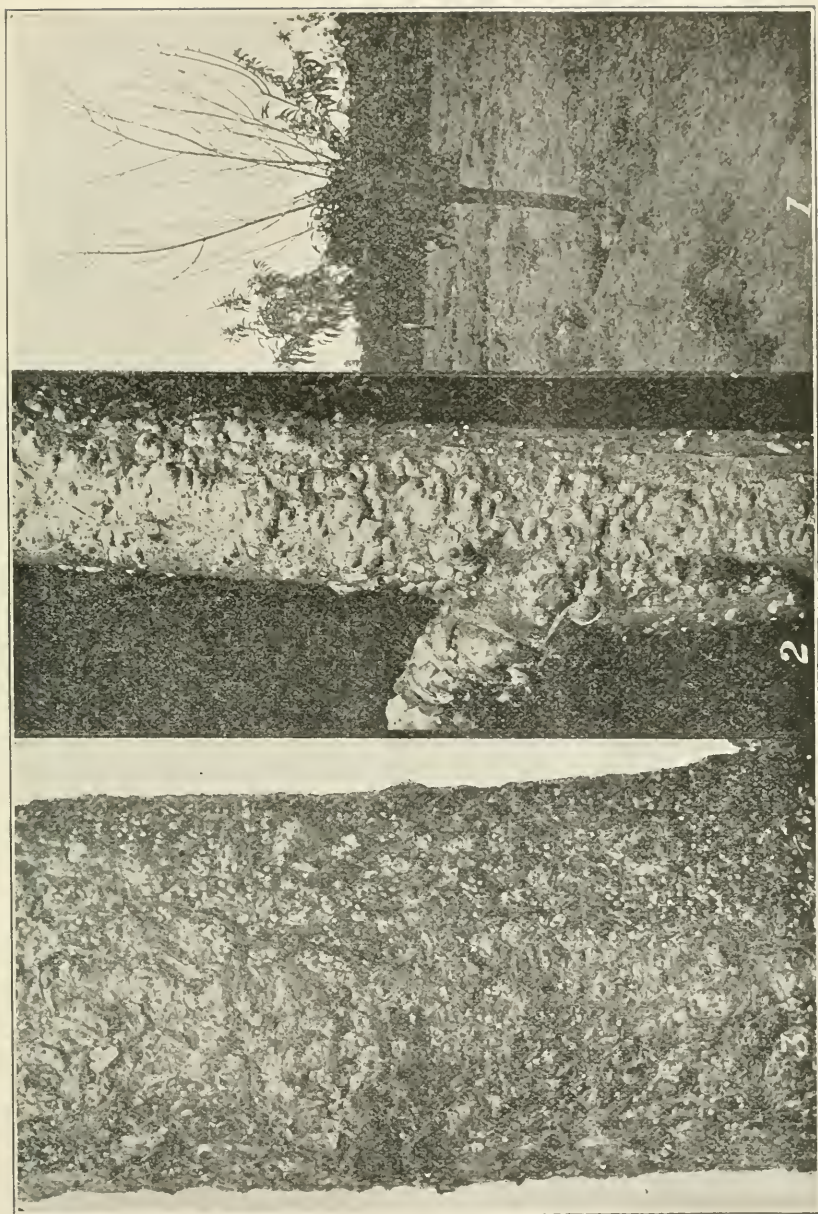


PLATE 1—San Jose Scale and its work. 1, peach tree with top killed by scale; 2, twig moderately infested, four times natural size; 3, limb badly infested with scale, twice natural size. (After Quaintance, U. S. Dept. Agr.).

THE SAN JOSE SCALE IN NORTH CAROLINA.

BY FRANKLIN SHERMAN, JR., *Entomologist.*

SUMMARY.

THE MORE IMPORTANT FACTS BROUGHT OUT IN THIS BULLETIN ARE AS FOLLOWS:

THE SAN JOSE SCALE IS WIDESPREAD IN NORTH CAROLINA AND DOES GREAT DAMAGE TO FRUIT ORCHARDS IF THEY ARE NOT REGULARLY TREATED TO KEEP IT IN CONTROL, BUT IN ORCHARDS WHICH ARE THOROUGHLY TREATED IT IS KEPT IN PRACTICAL CONTROL (NOT EXTERMINATED), AND THE ORCHARDS ARE PROFITABLE. THE INSECT IS A NATIVE OF NORTHERN CHINA, FROM WHERE IT WAS INTRODUCED INTO CALIFORNIA AND THENCE TO THE EASTERN UNITED STATES BY SHIPMENTS OF NURSERY STOCK. IT IS SMALL AND INCONSPICUOUS, AND THEREFORE IS NOT USUALLY NOTICED BY THE FARMER OR FRUIT-GROWER UNTIL THE TREES BEGIN TO DIE. ITS NATURAL POWERS OF SPREAD ARE VERY LIMITED, BUT AS THE YOUNG INSECTS ARE EASILY CARRIED ABOUT ON THE BODIES OF OTHER INSECTS OR BIRDS OR BLOWN BY THE WIND, IT WILL SPREAD THROUGH A LARGE ORCHARD IN A FEW YEARS. FOR TRANSPORTATION OVER LONG DISTANCES IT IS ALMOST ENTIRELY DEPENDENT ON THE SHIPMENT OF INFESTED PLANTS. IT ATTACKS NEARLY ALL KINDS OF FRUIT TREES (THOUGH SOME VARIETIES ARE COMPARATIVELY FREE), AND ALSO SOME OTHER PLANTS, BUT AS A RULE FOREST OR SHADE TREES DO NOT HARBOR IT OR SPREAD INFESTATION. IT WILL KILL A FRUIT TREE IN FROM ONE TO SIX OR EIGHT YEARS, DEPENDING ON THE AGE AT WHICH THE TREE BECOMES INFESTED, AND A FULL-GROWN TREE MAY NEVER BE ENTIRELY KILLED. THE INSECT IS ATTACKED BY SEVERAL PARASITES AND PREDACEOUS ENEMIES, BUT THESE CANNOT IN ANY SENSE BE RELIED ON TO KEEP IT IN CHECK. THE INSECT IS KNOWN TO EXIST IN 57 COUNTIES IN THE STATE, FIFTEEN OF THESE HAVING LOCALITIES IN WHICH IT IS GENERALLY DISTRIBUTED THROUGHOUT THE COMMUNITY.

THE REMEDY NOW MOST WIDELY USED FOR THE SAN JOSE SCALE IS TO SPRAY THE TREE THOROUGHLY WITH THE LIME-SULPHUR WASH IN LATE WINTER. THERE ARE SOME OTHER REMEDIES WHICH ARE ALSO SATISFACTORY, SOME REQUIRING LESS LABOR IN PREPARATION, AND THEREFORE FINDING FAVOR AMONG SOME GROWERS. AS THE SAN JOSE SCALE HAS CAUSED FRUIT-GROWERS TO PAY CLOSER ATTENTION TO THEIR TREES AND TO TROUBLES OF OTHER KINDS, IT IS CAUSING A CONSIDERABLE REFORM IN THE MANAGEMENT OF ORCHARDS. AND THE CAREFUL, UP-TO-DATE GROWER IS IN NO DANGER OF BEING PUT OUT OF BUSINESS BY THE INSECT.

THE BULLETIN FOR NEXT MONTH (JUNE) WILL GIVE AN ACCOUNT OF THE DISTRIBUTION OF THIS PEST IN THE DIFFERENT COUNTIES OF THE STATE, AND WILL GIVE NUMEROUS QUOTATIONS FROM LETTERS BY GROWERS SHOWING THE RESULTS OF THEIR EFFORTS TO SUBDUCE IT.

PERSONS WHO SUSPECT THAT THEIR FRUIT TREES ARE INFESTED WITH THE SAN JOSE SCALE, BUT WHO HAVE NOT ALREADY HAD THE MATTER PASSED UPON BY SOME ENTIRELY COMPETENT PERSON, SHOULD SEND TWIGS SHOWING THE TROUBLE TO THE AUTHOR, TOGETHER WITH EXPLANATORY LETTER.

FRANKLIN SHERMAN, JR.,
Entomologist, Dept. Agr., Raleigh, N. C.

THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 5.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, MAY, 1907.

THE SAN JOSE SCALE (*Aspidiotus perniciosus*, Comstock).

BY FRANKLIN SHERMAN, JR., *Entomologist*.

INTRODUCTION.

That the San José Scale is widespread in North Carolina may be easily seen by a study of the map shown in Fig. 1. That this insect will *if neglected* destroy an orchard (especially if the orchard is young when it becomes infested), has been proven beyond all doubt in every eastern State and in many orchards in North Carolina. That the absolute extermination of the insect in an orchard is not usually practicable has been the common experience of hundreds who have attempted it, though a few appear to have succeeded.

On the other hand, it has been fully demonstrated that the insect can be so controlled that profitable crops of fruit can still be secured, and there are many growers whose orchards are thoroughly infested who are making a better profit now than before the insect appeared.

In the commercial orchards of this State the San José Scale is very generally held in good control, but those who have so few trees that they do not wish to go to the expense and trouble of purchasing spraying pumps and treating their trees, are the ones who are losing in the fight.

The real control of this insect depends almost entirely on the energy of the individual grower. If he be watchful, energetic, and thorough in the care of *his own* trees he will not suffer materially on account of the neglect of his neighbors. If, on the other hand, he is neglectful, all the enterprise and industry of his neighbors will not save his trees. The number of infested orchards is so great that any system of State supervision of the work against the scale is now out of the question. The Entomologist of the State Department of

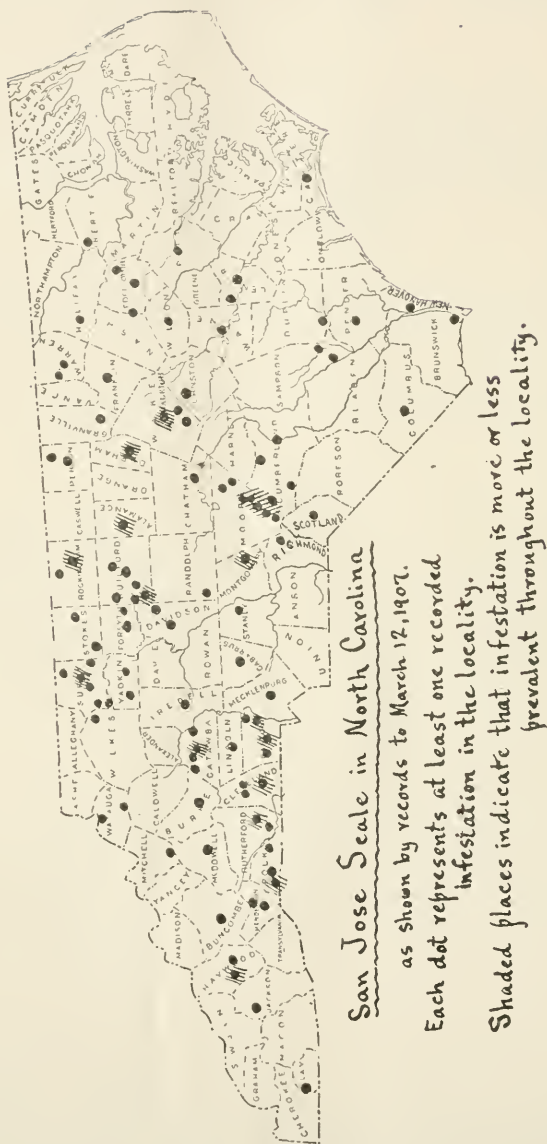


FIG. 1.

Agriculture and his assistants may inspect and advise, but it is impossible that they should follow up every case and compel treatment. It must be left to each individual grower to look after the treatment of his own trees.

There is so much demand for detailed information about this insect that in this BULLETIN we have attempted to give a fairly full account of it, and the remedies now most relied upon for its control.

EARLY HISTORY OF THE SAN JOSE SCALE.

There has been much speculation as to the original home of the San José Scale, and it was not until 1901-2 that the matter seemed to be definitely settled. At that time Mr. Marlatt of the United States Department of Agriculture at Washington made a trip of exploration in Japan, China, and other eastern countries, which established the fact that the original native home of the San José Scale is in northern China. From there it was introduced into California (probably by the importation of infested plants) about 1870. The insect remained unknown to science, however, until 1880, when it was first scientifically described and named.

The insect was not discovered in the eastern United States until August, 1893, or about fourteen years ago, when it was discovered at Charlottesville, Va. It was soon found that the infested trees had been purchased from nurseries which had been introducing stock from California, and these nurseries were found to be infested also. Fruit-growers and entomologists then began to make special search for the pest, and in 1897, only four or five years after its discovery in Virginia, it was known to exist in twenty States east of the Mississippi River. It must not be supposed from this that the infestation at Charlottesville was the only source of scale in the east. There can be no manner of doubt that it became established in many other localities and in several other eastern States at about the same time by the importation of infested plants; but Charlottesville happened to be the place at which it was first discovered.

BRIEF HISTORY OF THE INSECT IN NORTH CAROLINA.

So far as the evidence shows, the San José Scale gained its first foothold in North Carolina at or near Southern Pines, Moore County. It probably became established there about 1892, or 1893, approximately the same time as it became established at Charlottesville, Va. It was not recognized, however, until about 1895, when it had already gained a strong foothold. In 1897 it was known in six or eight localities in the State, and in 1900 it was known in about twenty places. At this time interest became more keenly aroused over it, and new localities came to light with great rapidity. In August,

1904, it was known to be in 44 counties, and at present (April, 1907) it is known to be in 57 counties out of a total of 98 in the State. There can be little doubt that it is in most, if not all, of the others.

NAME OF THE INSECT.

Every recognized species of plant or animal has what is known as a technical, or scientific, name. The object of this is to have one name (not subject to change or corruption by common use) by which it shall be known all the world over. Most common, conspicuous, or important species also have common names, which may be different in different localities, by which they are known to the public. The San José Scale has a scientific name and at least two common names besides the one by which it is commonly known.

Common Name.—When Prof. J. H. Comstock first discovered the insect he said that it was “the most pernicious scale-insect” known to him, and he proposed that it be called “The Pernicious Scale.” Owing to the fact, however, that it was discovered near the city of San José, California, it came to be known as “The San José Scale.” Since it has been discovered that the insect was originally a native of China, it has been suggested to call it “The Chinese Scale.” We have, therefore, three different common names by which this insect has been called: (1) The Pernicious Scale, (2) The San José Scale, (3) The Chinese Scale; but of these the second is in much the most common use.

The name San José is of Spanish origin. The “San” is pronounced just as it is spelled. In the word “José” the “J” has the sound of “H,” the “s” the sound of “z,” and the “é” the sound of “ay.” The proper way to pronounce the name of the insect is, therefore, as if it were spelled “San Ho-zay,” with the accent on the last syllable.

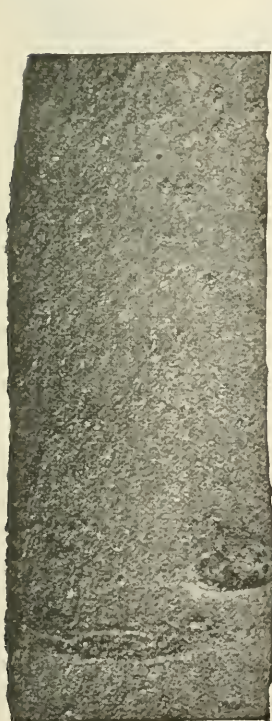
Scientific Name.—In science a plant or animal has two names, the first being the name of the group, or genus, to which it belongs, and the second being the special and particular name of that one species. When Professor Comstock discovered the San José Scale, he recognized that it belonged to the group or genus known as *Aspidiotus*, and as he wanted its last name (which he as discoverer was entitled to give it), he named it *pernicious*, on account of its pernicious nature. In scientific parlance, therefore, the insect is known by the designation *Aspidiotus pernicious*, Comstock.

APPEARANCE: HOW AND WHERE TO LOOK FOR IT.

Now that the matter of controlling the San José Scale has been demonstrated to be so entirely practicable (even easy), probably the one worst feature of the whole question is that the trouble is not

recognized by the average farmer until the trees begin to die, and by that time much injury has already been done. It is, therefore, very important to know what the insect is like, and where to look for it, so that the grower may be enabled to detect it *before* it has already become destructive.

Trees that are very badly infested with the San José Scale appear as if the branches had been dusted with ashes, having a grayish, scurfy appearance. If these branches and twigs be scraped with a knife it will be found that this unnatural covering is quite easily removed, coming off in little flaky patches. The appearance of a portion of such a branch is shown in Fig. 2, as it appears to the naked eye. (We regret that this illustration is not clearer, but it is very difficult to get a satisfactory illustration of this kind.) Examined under a magnifying-glass a thickly-infested twig (during the season when the insects are breeding) will likely present the appearance shown at *b* in Fig. 3. Each of the circular gray objects is a separate scale, each covering a tiny yellow insect underneath.



a



b

FIG. 2.—Portion of branch thickly infested with San José Scale, as seen with naked eye. (After W. E. Britton).

FIG. 3.—*a*, infested twig natural size; *b*, portion of branch thickly infested as seen with magnifying-glass. (After Howard and Marlatt, U. S. Dept. Agr.).

On thickly-infested branches they often become so crowded that the scales are piled over one another so that the real bark of the tree is not visible at all. In such cases of very bad infestation the scales often locate on the fruit, as shown in Fig. 4.

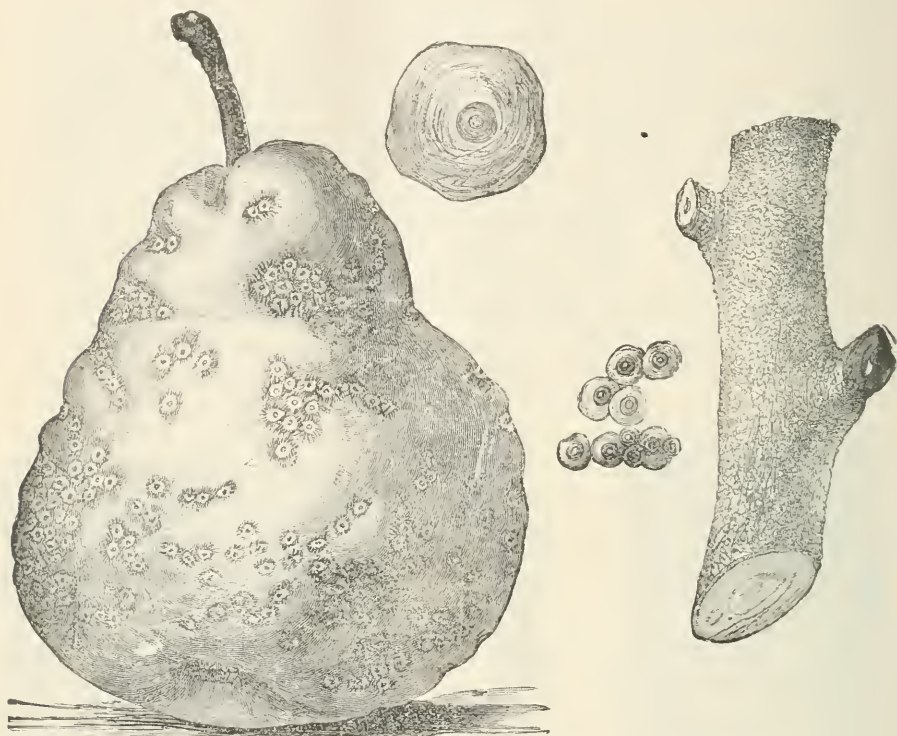


FIG. 4.—Infested twig natural size at right. Infested pear fruit natural size at left, showing spots caused by scales. In center are shown a group of young scales and a single full-grown female scale, all much enlarged.

Slightly infested trees or branches will not be completely coated over with the scales, and the bark may be of its ordinary color and appearance except here and there along the branches where the scattering scales are found. When the scales are scattering along the branches each scale is often (but not always) in the center of a slightly reddened spot on the bark. If the natural color of the bark be reddish this will not show plainly, but if the bark is of a light green or yellowish color the reddish spots are quite conspicuous. Such reddish spots will be about the size as shown on the infested pear fruit in Fig. 4. The gray scales themselves in the center of the spot will vary from the size of a pin-head (in full-grown individuals) down to the size of a pin-point (in the very young). If the scale is discovered while the trees are yet slightly infested there is no real reason

why a single tree should be lost if the grower will exercise the energy necessary to treat them.

The insects show a disposition to locate at the rings which mark the end of a year's growth, and also around the buds. These two places, therefore, should be watched in inspecting for it. The red spots on the bark are not likely to be so conspicuous at these places as they are on the clean areas of bark where there are no buds or rings. Wood of from two to four years' growth is likely to be worst infested. Hence we may say in a general way that *in inspecting trees which are suspected of being slightly infested, one should give special attention to wood of from two to four years' growth and should watch around the buds and yearly rings for the scales and should look for the reddish spots on the clear areas of bark.* It may often be more readily found by the spots than by seeing the scale itself. If such a spot be found, however, it must then be examined to see if it is caused by a true scale-insect, for there are certain unimportant diseases which may have a similar effect. If the gray circular scale is found in the center of the spot, and if the scale is readily removed by scraping gently with a knife-blade or with the finger-nail, then you may be pretty sure that it is San José Scale, and should at once send specimens to the Entomologist to find out for sure.

Turn one of the scales over gently with the point of a pin or knife-blade. If it is one of the large full-grown scales the insect may as likely be dead as alive under it, for the scale often adheres long after the insect is dead. If the insect is dead, the dried body will likely be found as a thin yellowish-brown particle under the scale. If the insect is alive it will be seen as a little yellow object slightly egg-shaped, but more pointed at one end, and slightly flattened.

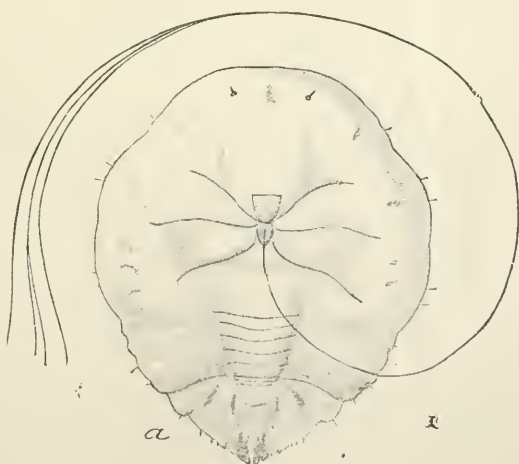


FIG. 5.—Adult female of San José Scale, without scale, very much enlarged. The long whip-lash-like object is the sucking-tube through which the sap is sucked from the tree. (After Howard and Marlatt, U. S. Dept. Agr.).

These large full-grown round scales are always females, and a picture of an adult female insect of the San José Scale, without her scale, is shown greatly enlarged in Fig. 5. Press the body with the point of the knife or pin and it is easily crushed, yielding a tiny bit of yellowish, oily liquid.

If you rub the flat of the knife-blade along the thickly-infested branch the insects will be crushed in such numbers that the oil from their bodies becomes quite noticeable, though of course not enough to run down the limb.

DIFFERENT AGES AND STAGES OF GROWTH.

In Fig. 3, note in the enlarged picture, that in the extreme lower right-hand corner there is a scale which is oblong in shape rather than rounded. Two other similar scales are seen near the left border of the figure, about an inch from the top. These are *male* scales, and may be readily distinguished from the female scales, which are nearly circular. The very large circular scales are of full-grown females, and these at largest are about the size of a pin-head, so you can see by comparison that the partly-grown scales are quite small. Females are usually much more abundant than the males.

Now look at Fig. 3 again. On the right-hand border, about an inch from the top, notice an insect which has legs. This is a *young* scale-insect which has a few hours' liberty after birth before it begins to feed. At this stage it can crawl about. Several of these young insects are to be seen in the figure, especially near the top. These young insects when in this active crawling stage are so very small as to be barely visible to the unaided eye, and are yellow in color. After the young insect has crawled about for an hour or so it becomes hungry and inserts its delicate slender beak or sucking-tube (see Fig. 5 for sucking-tube of grown insect) into the tender bark and begins to suck the sap. This slender sucking-tube is really the insect's mouth just as the trunk of an elephant is his nose. Once the insect inserts its tiny beak into the bark and begins to feed on the sap the scale begins to be formed over the body. The scale is begun by the secretion of a waxy substance from the back of the young insect, and this is added to later by shedding the skin from time to time. At first the newly-formed scale is white and oblong, of the same shape as the body of the young insect as shown at the top in the center of Fig. 3. Then the scale becomes more rounded, and as it grows it becomes darker, until it is dark-gray or almost black—when fully grown the scale begins to fade in color.

We have already described the full-grown *scales*; now let us consider the full-grown *insects*, for it must be remembered that the body of the insect itself is not the same as the scale, but is concealed under and is separate from the scale, or at most only slightly attached to it.

The full-grown female insect always remains under the large, gray, circular scale and there gives birth to her living young. The adult female is without legs, wings, or even eyes (Fig. 5), but she is provided with a slender organ resembling a whip-lash which serves to draw the sap from the tree. Her reproductive powers are very great, as will be shown later. Indeed, her entire activities are confined to the taking of food and giving birth to young.

We have seen that the males develop under oblong scales, but when they become adult, instead of being helplessly fastened to the tree like the female, they develop into delicate, tiny winged creatures, as shown, very greatly enlarged, in Fig. 6. Below the right wing in picture notice a small circle with a little mark in the center. This little *mark* (not the circle) shows the actual size of the adult male insect; so you can see that it is quite small. The adult male is pro-

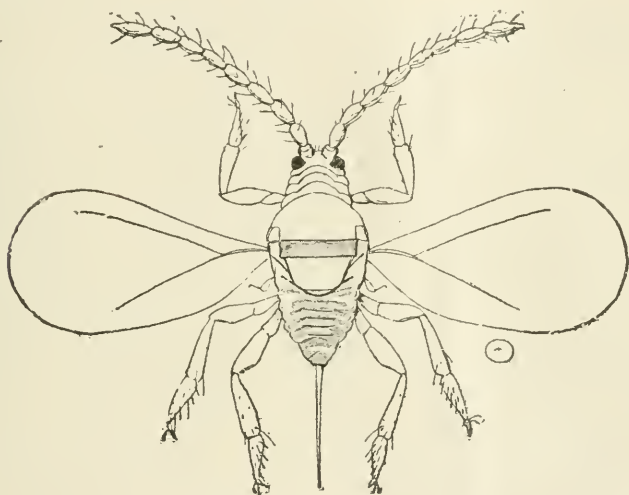


FIG. 6.—Adult male of San Jose Scale. Compare with adult female as shown in Fig. 5. (The tiny mark in the circle below the right wing indicates the actual size of the insect). (After Howard and Marlatt, U. S. Dept. Agr.).

vided with legs, wings, antennæ ("feelers") and with *two pairs of eyes*. One of these pairs of eyes occupies the place of the mouth, for this adult male takes no food, and lives only a short time, but during that time provides for the continuation of the species.

LIFE-HISTORY OF THE INSECT.

In discussing the different stages of the insect many points in its life-history have been mentioned, but a repetition and summing up may emphasize them. The adult females begin to give birth to *living young* in the spring. In this the San José Scale is an exception, as most insects lay eggs. Breeding in this State begins from

March to June, depending on season, altitude, climate, etc. After crawling for a short time the young insects insert their beaks (sucking-tubes) and begin to feed. Then the scale begins to form over the body, and the insect is thus confined at that spot. When the skin is shed, the legs, eyes, and antennæ (feelers) are shed off with it, and thereafter the female insect is always eyeless, legless, and wingless; simply has the organs for taking and digesting food and for reproduction (Fig. 5). It takes the female from thirty to forty days to reach maturity and the males not quite so long. The male develops finally into a tiny, yellowish, two-winged flying insect (Fig. 6). The mature insect has no mouth for taking food, but is provided with an *extra* pair of eyes; this renders it more proficient in finding mates, and thus aids in the multiplication of the species. In this State there are probably from five to eight generations in a season, and as a single female may bring forth many sets (broods or litters) of young, progeny of a single fertile female, in the course of a season, if there were no fatalities, would by actual calculation number among the *billions*. Remembering that many of the insects are destroyed by enemies or weather, as described later, we can still see that it is no wonder that a tree that becomes infested while young is almost sure to die unless thoroughly and persistently treated. The most active period of increase is during August, September, and early October. Breeding ceases when really cold weather sets in, usually between the middle of November and middle of December, though in mild winters the insects have been known to breed in the warmer parts of this State in January. During the winter the adult insects nearly all die, so that it is mostly the partly-grown insects that pass the winter. These overwintering scales are small and are very dark in color.

The San José Scale does not devour the leaves or fruit of a tree as do some kinds of destructive caterpillars. Its method of obtaining food is to insert the tiny beak into the tender inner bark and suck out the sap. Hence a tree which is badly attacked is weakened by loss of its sap, and usually puts forth scanty foliage in the spring and may be unable to mature a crop of fruit.

HOW THE INSECT SPREADS.

We have seen that the insect can only crawl about for a few hours after birth, and that therefore it could only spread very slowly, and only during the breeding season, if it were entirely dependent upon its own powers. As a matter of fact, however, there are various outside agencies which aid them in spreading into new trees, new orchards and new localities. Chief among these outside agencies are: (1) Wind, (2) Birds, (3) Insects, (4) Commerce in nursery stock. These, with its own limited natural powers, constitute its principal

methods of spread. We will consider each of these separately, considering first its natural powers.

Natural Spread.—If one of the young insects should start out as soon as born and run as rapidly as it could until it became necessary for it to settle down and begin to feed, it could only travel a short distance, perhaps one or two rods. It is evident, therefore, that the vast majority of the young insects settle on the same tree on which they are born. If the trees are so set and pruned that the branches of separate trees do not interlock, it will be almost impossible for the young insects to get from one tree to another of their own accord, and this is an important point, for the spread of the scale in thickly-set orchards may be very materially lessened by keeping the branches so pruned that they shall not reach from one tree to another. But in spite of this, the insects will usually spread to the other trees more or less rapidly by other means.

Spread by Wind.—Notice that we have said that the young insects are very, very small; therefore, if a wind blows through the orchard during the breeding season (from April to December) the young crawling insects are liable to be blown about from place to place like particles of dust. Indeed, in almost every case where a large orchard becomes infested it is to be noted that it spreads most rapidly in the direction of the prevailing winds. Of course it is mere chance whether the young insects which are thus blown from one tree will find lodgment on another, and these winds no doubt leave many thousands to die on the ground. But it is perfectly evident that many are spread from tree to tree by this means.

Spread by Birds.—If a bird alights in a scale-infested tree at any time during the breeding season some of the young insects may crawl upon its feet or feathers and be carried off into other trees, there to crawl off again. There can be no doubt that they are often established on new trees in this way. We have sometimes found in our inspections that the portion of a tree close around an old bird's nest may be thickly infested, while other parts may be slightly infested or almost entirely free from the insect. In towns and villages we have found similar evidence, the lower branches, next to the street or walk, being most frequently infested, thus indicating that the English Sparrow plays an important part in its spread in such places.

Spread by Insects.—Insects play a part in the spread of this pest similar to that of the birds. Especially during the blossoming season, many insects are busy going from tree to tree and are thus liable to spread the young scale-insects. Even the species of Lady-beetles which attack and devour the San José Scale have been known to bear on their legs or wings the very young scale-insects.

Spread by Commerce in Nursery Stock.—All the means thus far considered contribute to the spread of the San José Scale to a limited extent—not more than a few miles at most. But by the shipment of infested trees from place to place the scale may be spread over great distances. If a nursery in California or Oregon were infested and trees were ordered by a grower in North Carolina, they would be dug and shipped, with scales attached, and the infestation would begin where the trees were planted.

We have seen that the insects have a tendency to settle near the buds. Now if a nurseryman desires to propagate a variety, it is done by cutting the buds and placing them in a young tree. If the tree from which the buds are taken be infested with scale, the nurseryman is likely to introduce the insect into his nursery, and then send it out to his customers on the trees which they purchase.

We can see, therefore, that although the San José Scale has very limited natural powers of spread, it is nevertheless able to spread with considerable rapidity, aided, as it is, both by accidental causes and by the hand of man.

KINDS OF PLANTS ATTACKED.

The San José Scale is not capable of living and thriving on all kinds of plants, and it is extremely important that the grower should know which ones are most liable to attack. It is primarily a pest of *orchard trees* and it is an exception, rather than the rule, to find it on any other. Of the orchard fruits, peaches, plums, apples, pears, and cherries seem to be worst attacked and die most readily in the order named. Certain varieties, especially of pears, seem to show considerable resistance, the Keiffer, Leconte, and Garber seeming to be less attacked than others, though by no means exempt.

Currants, Gooseberries, Roses, Grapes, Osage-orange, Thornapple and Japan Walnut are quite subject to the San José Scale, though not so readily attacked as the orchard fruits. Then there comes a long list of other plants upon which it is of accidental or rare occurrence, such as Persimmon, Walnut, Poplar, Chestnut, Sumac, Catalpa, Willow, Linden, Ash, Dogwood, Elm, Maple, Spruce, Cedar, Strawberry, Raspberry, Milkweed, and even Crab-grass. But it must be remembered that its occurrence on these last is unusual, and as a rule they are not attacked even though they stand close to orchard trees that are badly infested.

Forest and shade trees are very seldom infested with the San José Scale and are not appreciable factors in harboring or spreading infection. Growers often make serious and ridiculous mistakes on this point and give up hope because they imagine that the "scale is in the woods," or they try to destroy the forests which they suspect,

or spend hours in a fruitless search for it on the forest or shade trees, and then, when they find a scale (which is some other species in nine cases out of ten) they think that they have surely found it.

Let us repeat, then, with greater emphasis, that the *San José Scale* is primarily a pest of orchard fruit trees; it may also occur, but less frequently, on rose, grape, currant, gooseberry, mock-orange, and Japan walnut, but forest and shade trees are not appreciable factors in harboring or spreading it.

HOW LONG BEFORE IT KILLS THE TREE?

The answer to this question will depend upon the kind of tree and the age at which it first becomes infested. Let us take some different examples: 1. If the tree becomes infested as soon as budded, peach and plum are likely to die within from one to two years; apple, pear and cherry in from two to four years. 2. If they become infested when five years of age, peach and plum will usually die in three or four years, pear in four or five years, and cherry and apple in four to six years, or perhaps not at all. 3. If they become infested at the age of eight years or over, our observation has been that apples are not likely to be killed outright, though peaches, plums and pears may be. Of course, an infested tree should be regularly and thor-



FIG. 7.—Pitiful Lady-beetle. Below are shown the adult at *a*, the larva at *b* and the pupa at *c*, all much enlarged, the actual size indicated by a small line close by.

Above is shown a number of the insects feeding on the San José Scale in the blossom end of pear, also enlarged. (After Howard and Marlatt, U. S. Dept. Agr.).

oughly treated whether it is going to be killed or not, for otherwise it becomes a center from which the scale may spread to other trees or orchards. Furthermore, though a tree may be too hardy to be killed outright, yet the younger branches where the fruit should be borne may be injured to such an extent that the tree cannot mature a crop.

NATURAL ENEMIES OF THE SAN JOSE SCALE.

The orchardist is not entirely alone in his efforts to hold the San José Scale in check. There are a number of natural enemies which do more or less good in limiting the numbers of the pest. Every rainstorm during the summer doubtless washes off and drowns countless thousands of the young. There are at least two species of native Lady-beetles which commonly prey upon the scale. One of these is the Twice-stabbed Lady-beetle, about one-eighth of an inch long, black, and with a red spot on each wing-cover, the spots resembling tiny drops of blood, thus giving rise to its name. The other is called the Pitiful Lady-beetle, though we know not why, unless it be on account of its small size, for this insect is not as large as a pin-head. It is jet black.



FIG. 8.—One of the small 4-winged parasites which prey upon the San Jose Scale. Very much enlarged. (After Howard, U. S. Dept. Agr.).

In addition to these there are one or more species of parasitic flies which attack the insects and lay their eggs within them, the eggs hatching into tiny maggots which feed within the scale-insects and eventually cause their death.

In Florida a fungus disease has been found to prey upon the scale to a considerable extent, but attempts to introduce this into other localities have not met with much success.

Recently the United States Department of Agriculture at Washington has introduced from China a species of Lady-beetle closely

related to our "Twice-stabbed" species, and indeed one cannot easily tell one from the other. This also feeds upon the San José Scale, but thus far has not shown itself capable of holding it in practical control. We must still rely upon the spray pump if we wish to keep this pest in subjection.

REMEDIES.

The remedy which is at the present time most widely used against the San José Scale is the Lime-sulphur wash, applied with a spray pump. When carefully prepared and thoroughly applied it is invariably effective. Its objections are that it is somewhat troublesome to prepare, and is destructive to spraying apparatus by reason of its corrosive action. This latter point can be largely overcome by using brass pumps. Copper pumps or tanks are quickly destroyed by it. Ample experience has proven that salt, blue-stone, or other materials added to the wash do not appreciably increase its effectiveness, hence we have not discussed them.

As an alternative for those who wish to avoid the use of the Lime-sulphur wash, we recommend the material known as "Scalecide." This is an oil preparation which mixes easily with water and is then ready for immediate use. Its disadvantages are that it is not so certain as a remedy as the Lime-sulphur wash, and it is more costly per gallon, though many think that these drawbacks are more than offset by the ease with which it is used. We give complete directions for the use of both of these washes.

As "Scalecide" has much the same characteristics as a remedy for scale as kerosene or kerosene emulsion, and as it is much more readily prepared, we have, for sake of simplicity, omitted any discussion of kerosene or its emulsions.

It should be noted that both these remedies are only to be used in the late fall or winter season. It is impracticable to make a really successful fight against the scale in summer, and the winter treatments must be mainly relied upon. If the scale is discovered during the summer when the orchard cannot be treated, the best plan is to immediately remove and burn all trees or branches that are already dead or dying and determine carefully the extent of the infestation, so that when the winter season comes it can be fought to best advantage.

Lime-sulphur Wash.

There is a great deal of variation in the quantities of lime and sulphur used by growers to make a barrel of this wash, two men with orchards standing side by side often using different quantities with practically the same results. Therefore a slight departure from the fixed formulas is not a serious matter, and this safety with which

it may be used is a strong point in its favor. The following will be found satisfactory:

Stone lime	15 lbs.
Sulphur (flowers)	15 lbs.
Water (to make)	50 gals.



FIG. 9.—Making Lime-sulphur wash. Outfit used in preparing wash for young orchard of 400 peach trees. Original. (Photo by Sherman).



FIG. 10.—Steam-boiler outfit for making Lime-sulphur wash for orchard of 30,000 peach trees. Original. (Photo by Sherman).

Heat from 4 to 6 gallons of water to boiling over fire in large iron or brass kettle. Mix the sulphur with enough hot water to make a thin paste and pour it into the kettle with the hot water. Now add the lime, and as it slakes dash in a little cold water, as



FIG. 11.—Tree thoroughly sprayed with Lime-sulphur wash. Note the whitened appearance of tree, and note that every twig is covered. Original. (Photo by R. W. Collett).

needed, to keep it from boiling over or to keep it from becoming dry. Keep the fire going and stir the mixture frequently. As the slaking ceases keep it boiling from the fire for half an hour longer, then dilute with water (cold is all right), to make the 50 gallons; strain through a fine wire screen or cloth to remove all sediment, and spray.

If it is desired to make the wash in quantities of less than 50 gallons (one barrel) approximately the same *proportions* of lime, sulphur, and water should be used.

Notes About the Lime-sulphur Wash.—This mixture has such a beneficial effect on trees in removing old bark, in killing other insects which may be on the bark (Green Aphis, Oyster-shell Scale, Scurfy Scale, etc.), and in killing the spores of certain fungous diseases which may be present, that we believe it will become very popular as a late-winter treatment, whether trees are infested with San José Scale or not. As a precautionary measure it would be well to give



FIG. 12.—Peach trees before being pruned back for treatment. Note how difficult it would be to treat all the long, slender twigs. Original. (Photo by Sherman).

the orchard a treatment with it every three or four years no matter how healthy it may appear to be.

The Lime-sulphur wash not only kills the scales with which it actually comes in contact, but it forms a thin, firm coating over the twigs upon which the young insects seem to find difficulty in settling down to feed and grow. As this coating is gradually worn off by rains or by growth of the tree, it is important that the wash be applied as late in winter as possible so that the coating shall be present when the insects begin to breed in the spring. *The best time to treat the trees, therefore, is in late winter—as late as possible so the work is completed before the buds are much swollen.* Trees that are very badly infested may be given two treatments, the

first in late November or December, and the second as late as possible as just directed (usually in March), but once the scale is subdued one application late each winter is sufficient.

About a week after the trees are treated they will look almost as white as if they had been whitewashed, and it is then an easy matter to detect any places which were missed in the application. Absolute thoroughness must be the rule in treating trees for this scale. Spray the trees from two or three sides to be sure that it is done thoroughly, and then if missed spots are noted a week later go over the trees again and complete the job.

It is well to prune the trees before the wash is applied, so that any dead or useless wood will be removed, thus giving a better opportunity to treat thoroughly what remains.



FIG. 13.—Same orchard as shown in Fig. 12, after pruning and spraying. Note that all branches were shortened and that the trees are in thrifty condition. Original. (Photo by Sherman).

The majority of our largest and most successful peach-growers believe in pruning very heavily every year, and all growth of the year previous is cut back to short stubs. This results in a lower, stouter tree, capable of carrying a heavy load of fruit without breaking, and also renders it possible to give a very thorough coating with the wash. While it is not thought practicable to cut back apples quite so heavily, yet it must be remembered that low heading and liberal cutting back is a help in making a thorough application of this wash.

Trees that are so badly infested as to appear to be beyond saving may often be restored by cutting back to mere stumps, and then giving a thorough application of the wash. New growth is put

forth in the spring, and after one or two years a new and bearing top is gained. Fig. 14 shows such a tree in full bloom the second year after cutting back, while on the front of this BULLETIN is shown



FIG. 14.—Peach tree cut back to stub two years previous, now making new top and loaded with bloom. Original. (Photo by Sherman).

a similar tree loaded with fruit, when the same tree three years before seemed to be hopelessly infested with scale.

Scalecide.

While we are of the opinion that it is well for our growers as a whole to depend principally upon the Lime-sulphur wash, yet it is not to be overlooked that the necessity for boiling and the caustic action of the wash are serious disadvantages. It is well, therefore, that there is in existence a preparation which can be satisfactorily used for the San José Scale and which is easily prepared without the use of fire, boilers, etc. "Scalecide" is an oil preparation; made by the B. G. Pratt Co., of 11 Broadway, New York City. It costs from 60 cents to \$1 per gallon, according to quantity ordered. It is mixed with water at the rate of 1 gallon of Scalecide to 12 gallons of water, and after being stirred thoroughly is at once ready to use. This makes it very convenient for those having only a few trees, and some very large orchardists prefer it because of the ease with

which it is prepared, and because it is not so destructive to the spray pumps. During the past spring this material was used by the Candor Fruit Company, in Montgomery County, in their peach orchards of about 33,000 trees. At the same time the Lime-sulphur wash was being used in the Van Lindley orchard at Southern Pines, which is of about the same size.

We wish to point out that we do not think that this material is as safe to use, nor as certain in its results, as the regular Lime-sulphur wash, and it is certainly considerably more costly *per gallon or barrel*, yet, on the other hand, it is so very easy and convenient to use that it is likely to be more widely used in future, and we recommend it as having usually given better results than the other patent or proprietary substances which are now on the market for the control of this insect. We have had it under observation for two years at Raleigh and in Moore and Montgomery counties, and the general result is favorable.

When the manufacturers first placed this material upon the market it was claimed that it was effective when used at the rate of 1 gallon to 25 gallons of water, but this was soon proven to be an error, and 1 gallon to 12, or 1 to 15, is now recognized as the best strength at which to use it.

"Scalecide" can be used at any time through the winter and until the buds burst in the spring; but unlike the Lime-sulphur wash, there is no advantage in applying it in late winter, for it does not form a coat on the branches. On the other hand, *its best effect is secured by using it in late fall, as soon as possible after the leaves have fallen*, for at that season there are many young insects which will be readily killed, and as it is the young or half-grown scales that pass the winter it will reduce the number that pass through that season.

Can Both Remedies be Used to Advantage?

We believe that if a grower wishes to go at the San José Scale with the determination to do the very most thorough work possible against it, he can combine the use of the two remedies (Lime-sulphur wash and Scalecide) to excellent advantage. We base this opinion upon this line of reasoning, which is borne out by the facts as observed in orchards: A treatment of "Scalecide" in fall will kill off the very young scales, while the old scales naturally die during the winter. Hence, where Scalecide is thoroughly used in the fall practically all the scales that escape and pass the winter will be of about the same age, and will therefore come to maturity at about the same time early in the spring. If now this be followed up by giving a very thorough coating with the Lime-sulphur wash in late

winter many more of the insects will be killed, while the coating on the twigs will be nearly impervious to the young of the few that still remain. By thus killing the vast majority of the young in the fall, and rendering the tree practically uninhabitable for the few remaining progeny in spring, we might (by this theoretical reasoning) *almost* exterminate the San José Scale. No doubt two thorough applications of either one or the other of these remedies would do *nearly* as well—and we want to emphasize the fact that no grower should *expect* to *exterminate* this insect once it is thoroughly established on his trees. If he can exterminate it, well and good, but to go at it with the fixed expectation almost inevitably brings disappointment, and not infrequently the grower persuades himself into believing that he has exterminated it, only to find later that it has worked destruction while he thought it was not present. Once the San José Scale is discovered in an orchard regular yearly treatment should be decided upon and carried out, so far as may be practicable. Sometimes a winter may be passed over without treatment without serious results.

The matter of controlling this pest depends solely upon the energy and intelligence of the grower whose orchard is infested. The State could not possibly undertake to treat the orchards, nor is it possible for the Entomologist to visit all the infested localities and compel treatment. If a man is too negligent to keep the scale in check it is just as well that his orchard should die, and the fruit-growing industry in the long run will be benefited by his retirement from the business.

THE BULLETIN

OF THE

North Carolina Department of Agriculture.

THE SAN JOSE SCALE IN NORTH CAROLINA.

BY

FRANKLIN SHERMAN, Jr.

ENTOMOLOGIST.

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Tree thoroughly sprayed with Lime-sulphur Wash. Note the whitened appearance of tree, and note that every twig is covered. Original. (Photo by R. W. Collett).

JUNE, 1907

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION.

STATE BOARD OF AGRICULTURE.

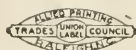
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THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 6.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, JUNE, 1907.

THE SAN JOSE SCALE IN NORTH CAROLINA.

BY FRANKLIN SHERMAN, JR., Entomologist.

IN THE BULLETIN for May (1907) a fairly complete account is given of the San José Scale and of the best known methods of fighting it. It has been thought advisable in this bulletin to emphasize the importance of this matter by giving an account of the conditions so far as known in every county where the pest is known to be present, and also to quote from letters recently received from the growers, showing the present conditions on their premises and the results of their efforts to subdue the pest.

A careful reading of this bulletin will show that the San José Scale is widespread in this State, and that if not combatted it is capable of inflicting great loss upon our fruit interests. It will also show that where the proper measures (as explained in THE BULLETIN for May) are being used with care, thoroughness and regularity, that profitable fruit crops can be, and are being, obtained, not only by the well-trained specialists in fruit-growing, but by ordinary farmers as well.

DISTRIBUTION OF SAN JOSE SCALE IN NORTH CAROLINA ORCHARDS.

A study of the map in Fig. 1 shows that this pest is widespread in this State. It is positively known to occur at sea-level in Brunswick County in the extreme southeastern part of the State, and on the high mountain ranges (over 4,000 feet) of Watauga County in the northwestern part of the State, and it is destructive in both places. As these points represent the two extremes of altitude and temperature to be found in our State, it is plainly seen that there is no section of North Carolina where it will not thrive. It is also found

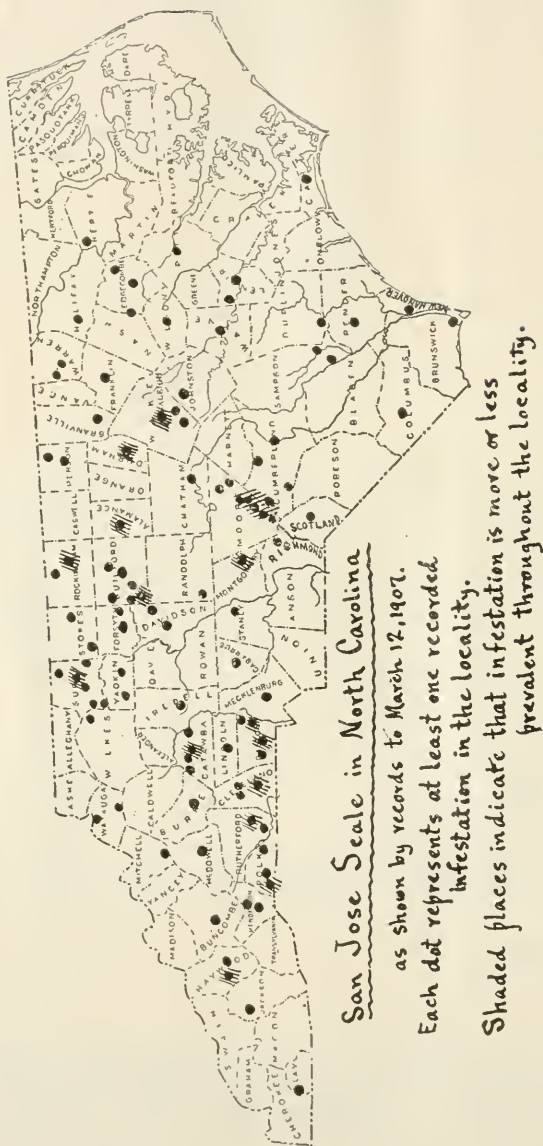


FIG. 1.

in the eastern counties of Pender, Carteret, Pitt and Bertie, and in the western counties of Clay, Jackson, Haywood, and Mitchell, all of which counties border Tennessee; and it is found in numerous counties between these extremes.

It is true that there is a large section in the extreme eastern and northeastern parts of this State where this pest is not known in our records, but this is a section which we have not often visited and we have very little correspondence from that section on fruit matters. There can be little doubt that this pest is in many localities in this section. On the other hand, the region most infested appears to be the piedmont belt, and in partial explanation of this it may be said that this is one of the most thickly settled parts of the State; we have occasion to visit in and pass through it often, and have had much correspondence from the people in the section. In the mountain counties infestation seems to be scattering, only one or two infested localities being known in each county.

Our records show positively that the pest is known in fifty-seven counties, in one hundred localities, and on the premises of no less than two hundred and fifty-two persons. In at least fifteen different places the insect is more or less prevalent, infesting all, or at least a large number, of the orchards in the locality. It must be remembered also that no regular system of inspecting orchards over the whole State has ever been practiced, and if this should be done there can be no doubt that our records of this insect would be greatly extended in short order.

We do not believe that this insect is in *every* locality in the State, and we are very sure that there are many orchards which are thus far free from its ravages—but the point we wish to emphasize is that there is no part of the State which is *immune* from it, and that it is no doubt present in many localities other than those recorded. The person who imagines that he is in an uninfested locality, or in a locality which is immune, should take notice. No locality in the State is immune, and the scale may be in almost any locality, though not known to us.

With the foregoing information regarding the general conditions as known throughout the State as a whole, we may now consider the conditions in each county where the San José Scale is known to be.

Alamance.—In Burlington six infested premises are on record, and our list is known to be incomplete. The scale at this place was first recorded in April, 1901. The following bears on the subject:

Relative to effectiveness of Lime-sulphur Wash as I have used it, would say that I, with two neighbors, sprayed some peach, apple and pear trees on our town lots last spring with very gratifying results, saving some very badly affected trees. The circulars and letters sent by you have been the cause of saving some fine pear and apple trees on my lot.—*Thomas L Sellars, Burlington, N. C., April 24, 1907.*

Bertie.—One case at Roxobel was reported in February, 1903. Only two trees were reported infested, these having been set the previous fall.

Burke.—One case was reported from Morganton in June, 1904, the scale in this instance being first noted on linden and elm trees, and later found in the orchard.

We have it, and, different from most others, we first discovered it on our shade trees, elms, lindens, flowering cherry, and plum. Last year found that it had attacked one peach orchard and spread through the center from west to east. * * * We have been using the Lime-sulphur spray on lindens to good effect, * * * but a great many of our shade trees are too large to spray or examine.—*W. Edwin Walton, State Hospital, Morganton, N. C., April 13, 1907.*

Brunswick.—In December, 1906, infested apple twigs were sent in from a place about three miles from Southport. Examination in March this year (1907) showed about ten trees infested out of a total of about one hundred. Trees had been painted by hand with oil which had checked the scale.

Buncombe.—In February, 1907, two small orchards were found infested on Victoria Road, Asheville. A slight case of infestation has also been noted in an orchard of four hundred apple trees at Weaverville.

Cabarrus.—In March, 1903, infested apple twigs were sent in from an orchard on R. F. D. No. 5 out of Concord. A year later another case was reported on the same route.

I have been entirely successful in keeping the pest in check with the Lime-sulphur Wash. Though my trees are practically free from the scale, I gave them another thorough treatment this spring, as I always do.—*F. B. Barnhardt, R. F. D. No. 5, Concord, N. C., April 5, 1907.*

I am glad to say in regard to the San José Scale that I have them about killed out. I have been using the kerosene and soap. I think they are getting pretty scarce and my trees are looking fine.—*John D. Walker, R. F. D. No. 5, Concord, N. C., March 29, 1907.*

Carteret.—At Newport the scale is widespread through the large orchards of George N. Ives & Son, where it has been irregularly combatted with various washes and with varying success for the past eight or ten years. There can be little doubt that other premises in the neighborhood are infested, though not on record.

Catawba.—This is one of the worst-infested counties. At Catawba one place is known to be involved and the presence of other infested premises seems certain. At Conover three places are positively recorded, with numerous others reported but unconfirmed. At Hickory one place is recorded which may be exterminated. At Newton and vicinity six cases are recorded and others are known to be infested.

Replying to yours of recent date, will say I had two trees infested with San José Scale a few years ago. I burned them and have had none since.—*W. H. Nicholson, Hickory, N. C., April 1, 1907.*

I sprayed my trees with Lime-sulphur and it surely cleaned up the scale. I got my neighbors to spray their trees, too. I saw trees sprayed with the Lime-sulphur a year ago and they have no scale on them now, and the bark is slick and smooth. It is the remedy and the people are beginning to use it right along.—*J. D. Bolick, Conover, N. C., March 29, 1907.*

I have had very good success in checking the San José Scale with the Lime-sulphur Wash. My orchard was badly infested when I commenced; I cut down 45 8-year apple, and 40 4-year peach, and nearly all the rest of my trees were affected, but since using the Lime-sulphur Wash I have not lost a tree from the scale. I have about destroyed the pest on all (150) of the trees except about 10, and have those under control. The information I have received from your department has been of incalculable benefit to my orchard.—*A. C. Hildebrand, Newton, N. C., March 30, 1907.*

I think I have the scale under control and my trees seem to be in very good condition. I have sprayed all my trees the past winter. I have been using the Lime-sulphur Wash and am well pleased with it.—*N. A. Fry, Newton, N. C., March 28, 1907.*

Chatham.—In March, 1903, a case was reported from Lockville, the scale having been found on young trees. The owner was treating, having removed the worst trees.

Clay.—In June, 1906, infested apple twigs were sent in from Brasstown. Examination of the orchard in April, 1907, shows the scale present in from slight to moderate degree in an orchard of about two hundred and fifty trees. On account of delay in securing spraying apparatus the orchard will not be treated until another year.

Cleveland.—One case each is recorded for the towns of Cleveland Mills and Lawndale, while five are recorded at Shelby and vicinity, this latter locality seeming to be pretty generally infested.

I have 400 trees in orchard. Have used Lime-sulphur, but it does not do all we would like; it does hold scale in check so it does not seem to damage fruit to any great extent.—*J. B. Nolan, Lawndale, N. C., March 27, 1907.*

This is my first season to use Lime-sulphur. I have an orchard of about 60 trees, apples and peaches, more or less affected with scale. Applied the wash about the last days of February. Got a pretty coat of white on them, and they all seem to be taking on new life. Am well pleased so far with the treatment.—*H. D. Wilson, Shelby N. C., March 27, 1907.*

Columbus.—One case is known at Whiteville, reported in March, 1905. It has been reported that the pest is destructive at Chadbourn, but if so, positive proof is not on record in this office. The orchard at Whiteville was sprayed with Lime-sulphur in February, 1906, but we have no record of treatment for this pest the past winter, though the orchard is reported in good condition.

Cumberland.—One case is on record for each of the localities of Raeford, Manchester, and Leavitt, while two are recorded at Fayette-

ville and vicinity. The orchard at Leavitt, which contains a total of some three thousand peach and plum trees, is kept in good condition by regular late-winter spraying with the Lime-sulphur wash. We have no recent record of the other cases. We suspect that there are other cases in this county, especially at Leavitt and Fayetteville.

Davidson.—One case at Thomasville and two at Lexington and vicinity are all that are shown in our records. The following letter is interesting, for it shows great trouble with the scale, and it *does not* indicate that the trees were ever properly sprayed to check it. This is a common experience among those who for one reason or another fail to treat it promptly and thoroughly.

Have had quite a lot of trouble with the San José Scale; finally cut down all of my trees in one orchard, reset it last year, and find the pest again this spring.—*J. E. Meredith, R. F. D. No. 2, Thomasville, N. C., April 1, 1907.*

Duplin.—The only recorded case in this county is that of a few small apple sprouts—set as much for ornament as for fruit—in a yard at Wallace. The pest is believed to be present in orchards at Faison, but this is unconfirmed.

Durham.—In the city of Durham this pest was first found in March, 1901, on a small lot. Two years later another case was found in the city. A year later (1904) an inspector entirely competent in recognizing the scale reported that it was very abundant on numerous premises in the city, but did not furnish names or addresses of parties. It is also present on a farm some 8 or 10 miles north of the city, where it is being held in full control by use of the Lime-sulphur Wash.

I have used the Lime-sulphur Wash with the best of results. If it is properly prepared and properly applied I am convinced that it will leave no trace of scale on the trees. I have some on which I used the wash three years ago and no trace of scale has appeared on them since. It requires considerable care in making to get it properly mixed.—*C. W. Massey, County Superintendent Schools, Durham, N. C., March 26, 1907.*

Am glad to say the San José Scale does not trouble me very much—I have very little that it does trouble left. I use a 20 per cent. kerosene solution. Perhaps I do not use it as often as I should, but I keep a close watch and spray when I see it coming. My plums are strong and vigorous trees, and it does not seem to hurt them as it did at first.—*M. H. Jones, Durham, N. C., March 27, 1907.*

Edgecombe.—Six cases of scale are on positive record in this county—one at Speed, two at Rocky Mount, and three in Tarboro and vicinity. The party at Speed reports that all his neighbors have it also, but positive proof is not on record. His testimony is interesting as showing the damage done by this insect when unchecked.

I have not used any remedy for San José Scale, owing to my health, in the past, but intend to use the Lime-sulphur next winter. I have cut out about 75

peach and several apple trees. I find that it is so bad on my farm that I believe it will pay me to destroy all the trees and commence anew. All of my neighbors have the scale. I have some trees that are real old that are dying with scale. Put out a few peach trees about a year ago and find them dead with it. I am very much discouraged along the line of fruit-raising.—*W. H. Andrews, Speed, N. C., March 30, 1907.*

I have been using "Scalecide" on my trees for the San José Scale; it seems to be doing the work all right. It checked the dying of trees.—*George J. Hales, Rocky Mount, N. C., March 27, 1907.*

I have saved trees when not too far gone by using kerosene oil put on with a little paint brush, preferably when the trees are not in leaf, but if they are I paint the trunk and limbs anyway.—*F. B. Lloyd, Tarboro, N. C., March 30, 1907.*

I have just found that I have scale and I began at once with Lime-sulphur as you recommended. Gave my trees a good spraying about the first of March.—*T. P. Jenkins, Tarboro, N. C., March, 27, 1907.*

Forsyth.—One case is recorded near Kernersville, and four others from Winston-Salem or vicinity.

I think I have it under control. I used the treatment you recommended (Lime-sulphur). I have about 200 trees in all.—*H. H. Weavel, R. F. D. No. 6, Winston-Salem, N. C., April 1, 1907.*

I bought a bucket spray pump and a gallon Target Brand Scale Destroyer, and sprayed about one dozen dwarf pear trees about first of December, together with two apple trees. The pear trees were but slightly affected, but one of the apples was literally covered with scale. I gave them the second application in February, and I notice the trees are putting out and don't detect any scale.—*W. J. Wolff, Winston, N. C., March 30, 1907.*

Franklin.—Two cases are recorded in this county, the owners in each case living in Louisburg. Not knowing anything of the way in which the wash was prepared or applied in the case reported in the following note, we cannot say why his results should be so unsatisfactory, but his report is a very unusual one:

I used the wash referred to (Lime-sulphur) for the scale two years, but could not check it. * * * The scale seemed so determined in spite of all my efforts that I cut down all my trees to save my neighbors', though I think our entire section is infected and only one party making an effort to check it.—*D. T. Smithwick, Louisburg, N. C., March, 1907.*

Gaston.—This is another of the worst-infested counties in the State. One case is known at Lucia, and three at Bessemer City, though there are almost certainly other cases at the latter place. The entire neighborhoods of Gastonia and Mount Holly are apparently infested, our records listing thirteen persons at Gastonia and seven at Mount Holly, though it is certain that there are numerous others at both places.

I sprayed my trees last year, and it did a lot of good. Lime-sulphur will surely kill the San José Scale. There is a lot of scale here all over the country.—*J. A. Best, R. F. D. No. 1, Bessemer City, N. C., April 1, 1907.*

There is no question but that any one whose orchard is infested by the San José Scale can (by pruning and thoroughly spraying with the Lime-sulphur Wash) so control the pest as to grow large and fine crops of fruit. I know this by experience. I had trees three years ago almost covered with scale: now they seem nearly free and are flourishing.—*Rev. J. C. Galloway, Gastonia, N. C., April 10, 1907.*

I have had better results from the use of oil emulsion (than from Lime-sulphur) for San José Scale. I used a 20 per cent. oil emulsion made after your formula, just as the sap begins to flow.—*R. F. Lineberger, Mount Holly, N. C., April 1, 1907.*

Granville.—Our only record of the San José Scale in this county is at Creedmoor, where it seems to be held in check.

I have used the Lime-sulphur Wash on my fruit trees with good results for two winters now, and if I had not used the wash my trees would have all been killed. Have had just as nice fruit on my trees for two years as I ever saw. I have some peach trees now in my orchard that the scale killed over half dead, and I used the wash and saved them. They put out a fine new growth last summer and now they look as healthy as any trees I ever saw.—*L. H. Longmire, Creedmoor, N. C., March 27, 1907.*

Guilford.—This is another county in which the scale is widespread. Our records list one case each at Rudd, Oak Ridge, and Jamestown; four in Greensboro and vicinity, and twelve in or on R. F. D. Routes out from the town of High Point. In High Point the town lots in the extreme southern end of town seem to be quite generally infested.

I have had great success in combatting the scale and at the present time I don't think I can find more than one or two trees in my orchard infested with the scale. I depend on the Lime-sulphur Wash. Circulars and advice you have been sending out have been of great benefit to me.—*C. M. Kirkman, Rudd, N. C., April 6, 1907.*

I feel that we are making satisfactory progress against the San José Scale.—*John J. Phoenix, Greensboro, N. C., March 26, 1907.*

Have given my trees no treatment the past winter as most of my trees are practically free from scales. I have tried kerosene emulsion, Lime-sulphur Wash, and kerosene alone, but think the Lime-sulphur is best, though kerosene rubbed on kills them cleaner than anything else I have tried. I think my trees would have all died, without your treatment, long ago.—*C. A. Osborne, Willowbrook Street, High Point, N. C., April 1, 1907.*

I am using Lime-sulphur Wash: gave them a good wash the past winter, and they are in fairly good condition now, I think.—*B. A. Jordan, R. F. D., No. 1, High Point, N. C., May 9, 1907.*

We have sprayed this spring with the Lime-sulphur Wash with satisfactory results. I had about given up the idea of fruit-growing until I received your bulletins about two years ago on this subject. These directions I carried out fully and sprayed thoroughly and am sure it has been of real value. I find it best to spray whether the scale is visible or not, as it is much easier to keep it off than to save a tree nearly dead with it.—*W. L. Kirett, R. F. D. No. 2, High Point, N. C., April 4, 1907.*

Halifax.—The only locality where the San José Scale is positively recorded in this county is Brinkleyville, where five premises

are recorded, and it is quite likely that there are others. Mr. Hunter's statement about securing information from other sources than our publications is an excellent hint to other fruit-growers who might with profit subscribe for high-class farm journals or fruit-growers papers that would help them out of many difficulties.

I spray my trees every spring with the Lime-sulphur Wash. Last spring I found a few scales, but have seen none this. I can't say that your circulars in regard to this pest have been of much benefit to me, simply because I have a good deal of other literature on the subject and had made a considerable study of the subject already.—*R. B. Hunter, Brinkleyville, N. C., March 26, 1907.*

My experience with spraying has not been very satisfactory, and my experience trying to raise fruit so far has been very unsatisfactory.—*John H. Vinson, Brinkleyville, N. C., March 28, 1907.*

Haywood.—In this, which is one of the very finest apple counties, the San José Scale seems to be widespread at Waynesville, where six cases are recorded (most very recently discovered), and a single case is on record near Clyde. In the best orchards it has never become very destructive, as it has been combatted from first discovery with Lime-sulphur, Scalecide, and in one or two cases with other washes. In the case at Clyde the pest may have been exterminated, as shown by the following:

The trees on my place that were infested with San José Scale were small and of recent purchase, and I cut and burped every twig of them. Since then I have seen nothing that resembles it.—*M. A. Kirkpatrick, R. F. D. No. 1, Clyde, N. C., March 27, 1907.*

Henderson.—One case each is on record from Fletcher and Hendersonville, in the latter case a fine large young apple orchard being involved.

This year I have not had the time to spray my trees with the Lime-sulphur Wash as I had intended to. Last year's experience, however, when I used this wash, fully satisfied me that it is a first-class method of keeping the scale in check.—*Benjamin H. Rutledge, Charleston, S. C. (orchard at Fletcher, N. C.), March 26, 1907.*

Winter before last we used the Lime-sulphur Wash, and while it did not clean the trees perfectly, it destroyed the larger part of it. Last fall we found it well scattered again on our trees and this year we have used "Scalecide," and we think with good effect. We have about 8,000 apple and peach trees. We think that San José Scale is fast spreading all over this part of the State.—*M. C. and C. F. Toms, Hendersonville, N. C., April 2, 1907.*

Iredell.—One town lot in Statesville is recorded, twigs showing the insect being sent in July, 1903. Some of the trees have since been destroyed, and others treated (with evident benefit) with the Lime-sulphur Wash. It is likely that there are other infested premises in Statesville.

Jackson.—In this county two cases are on record at Dillsboro, and in both cases it seems that the scale has not been successfully combatted, though for what reason we cannot say. It seems most likely that a lack of thoroughness in application was the chief difficulty, perhaps coupled with imperfectly prepared mixtures.

I have been bothered with San José Scale for about 4 years. I have washed my trees with kerosene oil and soap for two years and that failed, then I washed them with lime and sulphur and that failed. One day last week I cut down 30 of my trees and burnt them.—*H. R. Snider, Dillsboro, N. C., March 29, 1907.*

Johnston.—One case was discovered at Clayton and the owner has preferred not to trust to remedies.

I have used the axe on every tree where I could see a sign of the scale, and burned them, and will set no more trees there for some time.—*N. R. Pool, R. F. D. No. 3, Clayton, N. C., March 26, 1907.*

Lee.—One case is known at Sanford and one at Jonesboro. In both cases it is believed that the pest is being kept in good control.

I have been using the Lime-Sulphur Wash and think it benefited my trees very much. I think the scale can be kept under good control.—*J. D. McIver, Sanford, N. C., April 6, 1907.*

Lenoir.—Kinston and LaGrange are represented in our records with one case at each. In one of these cases it seems to have been thoroughly dealt with, while in the other case it is still present in destructive numbers, and is likely in neighboring orchards, from his report.

I never had but one tree with the San José Scale at my former (Lenoir County) home. I burned it, and the following winter used the Lime-sulphur Wash, and that was the last year I ever saw any.—*A. J. Sutton, Greensboro (formerly Kinston), 26, 1907.*

I have about abandoned my peach orchard for three causes: (1) I cannot get labor to assist in spraying; (2) the wood on most of the trees is about dead; (3) they are worth but little. It is useless for me to try to eradicate the scale in an old orchard like mine, when the scale is all around me in other orchards. It was first brought into this section by others. I have dug up and burned a large portion of my trees and intend to eventually destroy what I have left.—*D. M. Stanton, LaGrange, N. C., March 28, 1907.*

Lincoln.—Two cases, both in Lincolnton or vicinity, are on record.

As to my success in combatting San José Scale I think I can safely say I have them pretty well conquered. I have 60 trees in the infested orchard—the fruit in this orchard was the finest and clearest of worms of any in the community.—*C. L. Shrum, R. F. D. No. 4, Lincolnton, N. C., March 28, 1907.*

McDowell.—One case at Marion is all we have recorded for this county.

My fruit garden is small, say 75 trees. The San José Scale got on these before I was aware of it and so badly damaged some that I dug out and re-

planted. I wrote you and was directed how to spray with the Lime-sulphur Wash. I did this, first in late fall, * * * repeated early in spring. The trees made a vigorous growth and are in a flourishing condition.—*John M. Houck, Marion, N. C., April 5, 1907.*

Mecklenburg.—Two cases are on record for this county, both on R. F. D. No. 5 out from Charlotte.

I have not much faith in any kind of spraying for the San José Scale. I believe the best remedy is to cut down, pile up and burn—that is what I do when I notice a tree failing.—*Charles Gibson, R. F. D. No. 5, Charlotte, N. C., March 30, 1907.*

Mitchell.—One case, a large apple orchard, is on record at Spruce Pine. It is being held in control.

Montgomery.—Nine cases are on record at Candor, it being practically certain that all home orchards in that immediate vicinity are more or less infested. Of the nine cases known, five are on lots owned or tenanted by negroes, and two others are on property of whites so circumstanced that treatment is not practicable. The remaining two cases are in commercial orchards, one of 1,600 peach trees and the other of the Candor Fruit Company, ranking with the largest of the State, with about 33,000 peach. Both the commercial orchards are well kept, and are sprayed each winter with "Scalecide." In consideration of the circumstances, and upon urgent solicitation, representatives from this office sprayed the few trees on the other premises with "Scalecide." Another orchard of 16,000 peach trees has just been planted at Candor, with full knowledge of the conditions, the manager being familiar with the scale and expecting, as a matter of course, to deal with it.

Moore.—The first cases of San José Scale known in this State were found around Southern Pines, and the peach industry was for some time thought to be doomed to rapid destruction, but the growers with great energy and industry, by continually keeping abreast of the times in regard to the latest and best remedies, have been able to keep their "heads above water," so to speak, and it is safe to say that during the last five years, with the scale widespread in the locality, that as much money has been cleared from the peach crop as in any previous similar length of time. In these orchards the practical control of the San José Scale on a profitable basis is a solved problem, and the Lime-sulphur Wash is the chief dependence. Some few growers could not, or did not, stand the test, and for one reason or another allowed their orchards to be killed out, which process was greatly hastened by borers and lack of artificial fertilizers. In the summer of 1906 the seventh successive crop of peaches was shipped from Southern Pines. This year (1907) the crop is almost a total failure on account of very late spring freeze. Practically all orchards,

whether large or only for home use, in all the region about Southern Pines, are infested. Our records show thirty cases for the immediate vicinity of Southern Pines, two for Aberdeen, two for Pinebluff, and one each for Manly, Niagara, and Vass. It is also reported to be at Cameron, Carthage, and other places which have not been confirmed.

Southern Pines has long been the chief peach-growing locality in the State, an honor for which Candor, in Montgomery County, will be a close competitor when the large orchards there are regularly bearing. At Southern Pines are the following large peach orchards: J. Van Lindley Orchard Company, about 33,000; Niagara Fruit Company, about 10,000; Mr. Crawford Hutchinson, about 3,000; Mr. John Huttenhour, about 2,500; Mr. J. H. Tilghman, about 2,500; Mr. Joseph F. Richards, about 1,200, and others of less extent. Mr. J. D. Sayer, of Leavitt, Cumberland County, who has about 3,000 trees, is only a few miles from Southern Pines.

New Hanover.—One small orchard near Wilmington was ascertained to be infested in the fall of 1900, and by treatment, destruction of trees, and replanting, the scale has not gained in destructiveness.

Pender.—Quite a large young peach orchard at Burgaw is infested, but by use of Lime-sulphur Wash, together with occasional removal of badly infested trees, it is believed that it is not gaining in destructiveness.

Person.—One case is recorded at Bethel Hill, and another on R. F. D. 4 out of Roxboro.

I sprayed my orchard winter before last with Lime-sulphur and I think it did a great deal of good. I checked the San José Scale and the bark of the trees seemed to be in a healthy state the spring following. This past winter I failed to spray and scale has taken a new hold. I appreciate your correspondence and circulars, they are of great information to me.—*E. T. Mooney, R. F. D. No. 4, Roxboro, N. C., March 26, 1907.*

Pitt.—We have one small orchard at Greenville and another at Falklands on record, the latter having come to light the present (1907) spring.

Polk.—At least a half-dozen premises are known to be infested in the southern half of the village of Tryon, in some of which cases we know that it is being effectually controlled. One case is known at Greenriver and one at Columbus, this latter case showing the usual results of neglect or failure to appreciate the danger in time.

I have San José Scale on my place—have lost most of my trees already. All the ones that are now alive seem badly affected. The trouble had gone so far that I thought it useless to try a preventive, but since they have budded I notice some have life enough so that they might have some chance to be saved.—*J. P. Arledge, Columbus, N. C., April 2, 1907.*

Randolph.—One case is known at Bombay, in the southwestern part of the county, and the owner reports excellent results from treating the trees with Lime-sulphur Wash, and with soft soap.

Richmond.—One case only is recorded for this county, this being at Ellerbe. The letter from this party is interesting, not only on account of its cheerful optimism and confidence, but also on account of the method of singeing the trees with fire as an extra precaution. We believe that if practiced with caution this might be very satisfactory as a method to prepare the way for the Lime-sulphur Wash.

I sprayed last March just before the trees were in bloom, but haven't sprayed this season yet. My trees seem to be doing fine, and I had as fine fruit last year as I ever did have. Could not tell that more than 6 or 8 were infested, but sprayed all my orchard (about 250 trees) with the Lime-sulphur and am convinced that it will hold the scale in check. I shall resort to that remedy in future. I think the information received from your office has been of real service to me. For the worst trees, I took broom-sedge and singed them all over before I sprayed; did not let the blaze stay in one place long at a time. Some of the trees looked as if they were almost dead, but now look healthy and strong. I cut down and burned up three trees before I knew what to do. I am adding to my orchard each year.—*J. B. Smith, R. F. D. No. 2, Ellerbe, N. C., March 28, 1907.*

Rockingham.—Two cases are known at Spray and four in or about Reidsville, at which latter place there are probably a number of other cases not yet recorded. Of the four letters quoted below one is not yet positive, and two are quite unsatisfactory, while the last is the same old (yet ever-welcome) story of excellent results from the regular and thorough use of the Lime-sulphur Wash.

I sprayed my trees early this month with the Lime-sulphur Wash, went strictly by the formula, and have strong hope of getting good results from it. I have about 75 trees in orchard affected.—*J. H. Bennett, Reidsville, N. C., March 30, 1907.*

So far as I have gone with the spraying I have not had satisfactory results. Sprayed 2 years and I find this spring more scale than I have ever had. Some of my nice apples, sprayed last spring, were so bad I had to cut them down.—*S. H. Ware, Reidsville, N. C., March 26, 1907.*

I sprayed (with Lime-sulphur Wash) for the last two years and the scale seemed to get worse all the while, so I did not spray this winter. I have cut my peach trees all down.—*B. C. Smith, R. F. D. No. 3, Reidsville, N. C., March 26, 1907.*

My trees began to fail and die about 4 years ago, and I was at a loss to know the cause. I sent a few twigs to Raleigh and was informed and was advised to spray with Lime-sulphur Wash, which I did according to directions, giving my trees a complete spraying every spring. I am happy to say that I now have as pretty a lot of trees as I ever saw, and that the scale has nearly disappeared. I would not have a living tree now but for the use of the spray. It improves the tree and fruit very much as well as kills the scale.—*N. C. Tompson, Reidsville, N. C., March 29, 1907.*

Rutherford.—The village and vicinity of Ellenboro seems to be quite generally infested, eight cases being on record, with no doubt

that there are more. Very recently a new case has been discovered at Sunshine.

My trees are looking fine, almost free of scale, but as a precaution have sprayed them this spring with Lime-sulphur Wash, which seems to be the remedy, as my trees would have been dead if I had not used this or something else. The people who have not sprayed their trees are losing them fast.—*F. B. Byers, Caroleen, N. C. (orchard near Ellenboro), March 27, 1907.*

In my opinion, the spraying of trees in this community has been very beneficial and will result in much good to those who are trying to raise fruit. The trouble is there are some who do not take any interest.—*J. L. Wright, Ellenboro, N. C., March 27, 1907.*

Sampson.—Our records show two cases for this county, one at Kerr and the other at Delway. In both instances the Lime-sulphur Wash is being successfully used.

According to advice sent out from your office, I have used the Lime-sulphur Wash on my trees. I found that it almost exterminated the San José Scale. I am depending on it. I used it two years ago—some of my trees had died from the scale—since then I have seen very little sign. Your letters, circulars, etc., have been a decided advantage. They are a means of education that our people especially need.—*J. M. Alderman, Wallace (formerly Delway), N. C., April 6, 1907.*

I have had very good success with the San José Scale. I depend on the Lime-sulphur Wash. Your directions and information have been of real service to me.—*M. G. Bland, Kerr, N. C., April 6, 1907.*

Scotland.—One case, at Fontcol, is all that we have recorded, and we have had no recent report from it.

Stanly.—One case is known at Dowd, where it is being kept in control.

I have sprayed three years with the Lime-sulphur Wash with good results. I think I have them (scales) under control. I have 116 trees and sprouts. I can't say that all are infested, but I spray them just the same, as it keeps the trees healthy and green.—*Jasper Bell, R. F. D. No. 2, Albemarle (formerly Dowd), N. C., March 28, 1907.*

Stokes.—A case each at Dillard and at King are on record for this county, and we have no very recent report as to conditions at either place.

Surry.—This county, which is one of the leaders in the production of apples, is also one of the worst-infested counties in the State, yet there is much successful activity among the growers in keeping it in check. It is known that there are many more cases of scale in this county than our meagre records show. We have listed: Five cases at White Plains, two at Bridge, two at Mount Airy and vicinity, and one case each at Elkin, Pilot Mountain, and Stateroad. The following quotations from the owners of infested orchards show clearly that excellent and satisfactory progress is being made.

I tried Lime-sulphur Wash on my orchard last year and it did the trees a lot of good, and I saved a pear tree that was almost dead. I am trying it again this year.—*J. S. Griffith, Bridge, N. C., March 27, 1907.*

I think I have saved my orchard through your instruction; have used the Lime-sulphur for three years; this year could not find any scale on but one tree, but I sprayed the whole orchard. I have my trees in nice shape.—*J. S. Smith, R. F. D. No. 1, White Plains, N. C. (formerly Bridge), March 27, 1907.*

I have 100 pear, 300 peach and 300 apple trees. I use the Lime-sulphur Wash. My pear trees are all right, have saved all of them, but I lost a few apple and about 100 peach before I knew what was the matter. I think now I can save the balance of my trees.—*C. L. Robertson, White Plains, N. C., March 29, 1907.*

My orchard was badly infested two years with the scale, and I wrote you for instructions and have the scale under good control. I have not lost a tree since I commenced using the Lime-sulphur Wash.—*J. A. Blue, White Plains, N. C., March 28, 1907.*

San José Scale is the big trouble. A few of us are using the Lime-sulphur; it has checked it to a great extent. We are trying to get others to save their orchards.—*Jacob Jackson, White Plains, N. C., March 27, 1907.*

Wake.—Here in Raleigh many trees in the city lots are infested, our records, however, only showing eleven out of what is certainly a much larger number. In several cases the Lime-sulphur Wash is being used with good results, and oil preparations have also been used. The scale is also known in orchards in three other places in the county, at McCullers, Garner, and Wake Forest, this last case being only recently discovered.

Warren.—One case is known at Ridgeway and another at Warren-ton. It is reported, but not confirmed, that other orchards at Ridgeway are infested.

Can sincerely say the instructions from your office have done me much good. My peach trees were so thoroughly infested that the tops of several perished. Cut them back almost to a stump and sprayed carefully with the Lime-sulphur Wash; now I can find no scale in my garden, and the trees cut back have re-grown a beautiful top of vigorous, healthy wood now well loaded with fruit buds.—*Nat. Allen, Superintendent County Schools, Ridgeway, N. C., March 29, 1907.*

Watauga.—At Mabel one young tree in a newly-set orchard was found to be infested and was immediately destroyed, no evidence of the pest having been found since. At Blowing Rock one small tree was found infested in a small home orchard, and the pest has also been found at several places in the 33,000-tree orchard of Mr. Moses Cone, where it is being kept under rigid control by careful spraying with the Lime-sulphur Wash, supplemented by the prompt destruction of any trees found to be badly enough infested to be in anywise a menace to others near by.

Wayne.—Five cases of scale are known in or near Goldsboro. Aside from the case recited below we know that in one other instance the scale has been nearly exterminated by using Lime-sulphur Wash. No recent report from the others.

I have used the Lime-sulphur Wash with unvarying success, and have found it effective when properly made and applied.—*J. K. Bryan, Steward State Hospital, Goldsboro, N. C., April 6, 1907.*

Wilkes.—One case at Roaring Gap is all we have recorded, but according to that party the entire community is infested.

I have lost all of my young orchard and have grubbed the trees up and burned them. The orchard was too far spent before I knew what was the trouble. This entire community is infested. I do not know a single orchard but what has the scale.—*A. C. Phillips, Roaring Gap, N. C., April 1, 1907.*

Wilson.—One case is known in the city of Wilson, which has been treated irregularly with the Lime-sulphur Wash. The owner is a merchant and cannot look closely after the orchard.

I have used the Lime-sulphur Wash some and find that it does the work all right, but requires more time and patience than I have, and it rusts and clogs the pump a great deal.—*G. D. Green, Wilson, N. C., March 26, 1907.*

Yadkin.—Four cases are known in this county, two of such recent discovery that there has been no chance to work against it. One case is on R. F. D. No. 1, Marler, while the others are on routes out from Yadkinville. The letter quoted below shows a common experience of neglect repented for afterwards.

My trees are still considerably infested. Sprayed most of my trees in early spring of 1906 with Lime-sulphur and it did a great deal of good where applied thoroughly. I had such a poor crop of fruit last year I did not spray this spring, but I regret it very much now as several of my peach trees are in full bloom, and I fear the scale will kill them before the end of the season.—*S. S. Wagoner, Marler, N. C., March 29, 1907.*

- I. ANALYSES OF FERTILIZERS—FALL AND SPRING SEASONS, 1906-'07.
II. ANALYSES OF COTTON-SEED MEALS.
III. REGISTRATION OF FERTILIZERS.

THE BULLETIN

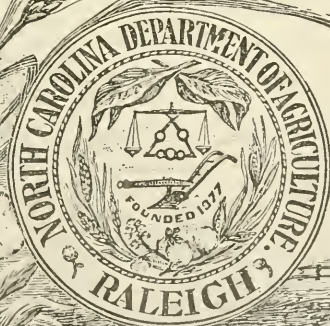
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AGRICULTURE

Raleigh



JULY, 1907.

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THE BULLETIN

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 7.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, JULY, 1907.

I.—FERTILIZER ANALYSES.

FALL SEASON, 1906—SPRING SEASON, 1907.

BY B. W. KILGORE, STATE CHEMIST.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the fall months of 1906 and the spring months of 1907, and therefore represent the character of fertilizers the farmers have used on the crops of the past year. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know whether or not they contained the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in a condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other sub-

stances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by the plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the head of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration; but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

FORM OF POTASH IN TOBACCO FERTILIZERS.

Tobacco growers are becoming yearly more disposed to know the form of potash, whether from kainit, muriate or sulphate, which enters into their tobacco fertilizers. Considerable work of this kind has been done for individuals, and we now determine the form of potash in all tobacco brands, for the benefit of tobacco growers.

The term potash from muriate, as reported in the analyses, does not mean, necessarily, that the potash was supplied by muriate of potash. Sulphate or some other potash salt may have been used, but in all fertilizers where the term potash from muriate is used, there is enough chlorine present to combine with all the potash, though it may have come from salt in tankage, kainit, or carnallite. As the objection to the use of muriate of potash in tobacco fertilizers arises from the chlorine present, it does not matter whether this substance is present in common salt or potash-furnishing materials.

The use of sulphate of potash where there is chlorine present in the other ingredients of the fertilizer will not prevent the injurious effect of the chlorine. The term potash from muriate in our analyses, therefore, means that there is sufficient chlorine present in the fertilizer from all sources to combine with the potash to the extent indicated by the analyses.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the cost of fertilizing materials is liable to change as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1906.

In Unmixed or Raw Materials.

Phosphoric acid in acid phosphate.....	4	cents per pound.
Phosphoric acid in bone meal.....	31½	cents per pound.
Ammonia	14½	cents per pound.
Potash	5	cents per pound.

In Mixed Fertilizers.

Phosphoric acid	4½	cents per pound.
Ammonia	16½	cents per pound.
Potash	5½	cents per pound.

The valuations decided on this season, for the reasons already given, are:

VALUATIONS FOR 1907.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano	31½	cents per pound.
For ammonia	15½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid	4½	cents per pound.
For ammonia	16½	cents per pound.
For potash	5½	cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—2 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and ammonia 2 per cent, the calculation is made as follows:

Percentage or Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton 2,000 Lbs.
8 pounds available phosphoric acid at 4½ cents -----	$0.36 \times 20 =$	\$7.20
2 pounds potash at 5½ cents -----	$0.11 \times 20 =$	2.20
2 pounds ammonia at 16½ cents -----	$0.33 \times 20 =$	6.60
Total value -----	$0.80 \times 20 =$	16.00

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance	\$3.20	\$3.20	\$3.40	\$3.20
Apex	2.70		3.80	3.00
Ashboro	3.20	3.20	3.60	3.20
Asheville	4.00	4.00	4.00	4.00
Chapel Hill	2.95	3.20	3.90	3.20
Charlotte	2.65	3.20	2.85	3.20
Clayton	2.48	2.86	3.63	2.83
Cherryville	3.85	3.60	3.40	3.60
Clinton	1.60	3.00	3.20	3.00
Creedmoor	3.00	3.00	3.80	3.00
Cunningham	3.00	2.40	4.00	2.40
Dallas	3.00	3.60	3.40	3.60
Davidson College	3.00	3.20	2.20	3.20
Dudley	1.70	3.00	3.20	3.00
Dunn	2.00	2.80	3.20	2.80
Durham	2.80	2.83	3.20	2.83
Elkin	3.60	3.20	3.60	3.20
Elm City	2.10	2.60	3.20	2.60
Fair Bluff	1.60	3.80	2.40	3.80
Fayetteville	1.80	3.00	3.00	3.00
Forestville	2.85	3.00	3.80	3.06
Gastonia	3.12	3.25	3.12	3.25
Gibson	2.10	3.50	2.10	3.50
Goldsboro	1.80	2.80	3.20	2.80
Greensboro	2.96	3.00	3.40	3.00
Hamlet	2.00	3.00	3.60	3.00
Henderson	3.00	2.83	3.55	2.83
Hickory	3.20	3.60	3.20	3.60
High Point	3.00	3.08	3.40	3.08
Hillsboro	2.88	2.88	2.68	2.88
Kernersville	3.00	3.00	3.40	3.00
Kinston	2.10	2.80	3.50	2.80
Laurel Hill	1.90	2.40	3.80	3.40
Laurinburg	1.90	3.40	3.80	3.40
Liberty	2.72	3.60	3.80	3.60
Louisburg	2.95	3.00	3.80	3.00
Lumberton	1.60	3.60	3.70	3.60
Macon	3.05	3.00	3.85	3.00
Madison	3.00	3.00	3.40	3.00
Matthews	2.60	3.20	3.20	3.20
Maxton	1.80	3.40	2.70	3.40
Milton	3.44	2.40	4.00	2.40
Mocksville	3.36	3.20	3.40	3.20
Morven	2.55	3.60	2.50	3.60
Mount Airy	2.20	3.40	3.80	3.40
Nashville	2.30	2.90	3.40	2.90
New Bern	1.25	1.75	3.95	1.75
Norwood	3.68	3.20	3.20	2.23
Oxford	3.04	2.83	3.55	2.83
Pineville	2.77	3.25	3.00	3.20
Pittsboro	2.60	3.30	4.10	3.30
Polkton	2.40	3.00	2.20	3.00
Raleigh	2.56	2.83	3.40	2.83
Reidsville	3.00	2.96	3.40	2.36
Rockingham	2.10	3.00	3.80	3.00
Rocky Mount	2.20	2.50	3.40	2.50
Ruffin	3.28	2.80	3.40	2.20
Rural Hall	3.28	3.20	3.60	3.20
Rutherfordton	3.05	3.65	3.05	3.65
Salisbury	3.25	3.20	3.20	3.20
Sanford	2.10	3.00	3.40	3.00
Selma	2.10	2.80	3.20	2.80
Shelby	2.90	3.60	3.90	3.60
Siler City	2.60	3.60	3.80	3.60
Smithfield	2.20	2.80	3.20	2.80
Statesville	3.50	3.20	3.60	3.20
Stem	2.95	2.83	3.80	2.83
Tarboro	2.30	2.40	3.00	2.40
Waco	2.90	3.60	3.40	3.60
Wadesboro	2.30	3.00	2.50	3.00
Walnut Cove	3.00	3.00	3.40	3.00
Warrenton	3.05	3.25	4.10	3.25
Warsaw	1.50	3.00	3.20	3.00
Washington	2.65	1.75	2.25	1.50
Weldon	2.55	1.90	3.85	1.90
Wilson	2.00	2.60	3.20	2.60
Winston-Salem	3.00	3.00	3.40	3.00

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-soluble Acid.		Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.			
MIXED FERTILIZERS.															
Brands claiming															
5483	Baugh & Sons Co., Norfolk, Va.	Baugh's Double Eagle Phosphate.	Concord	S	5.90	2.10	8.00	8.00	.86	1.16	2.00	1.00	\$14.90		
5513	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Comet Guano	Siler City	R	6.83	2.05	8.88	8.88	.36	1.36	1.72	1.56	15.38		
5494	Navassa Guano Co., Wilmington, N. C.	Navassa Complete Fertilizer	Taylorsville	R	4.60	3.55	8.15	8.15	.54	2.40	2.14	1.08	15.58		
5486	Reidsville Fertilizer Co., Reidsville, N. C.	Banner Fertilizer	Reidsville	D	4.60	2.91	2.51	4.60	.64	1.46	2.10	1.36	15.18		
5533	Richmond Guano Co., Richmond, Va.	Premium Wheat Grower	Asheville	S	6.13	4.26	10.39	7.2	.74	1.46	2.04	1.61	16.41		
5463	Royster, F. S., Guano Co., Norfolk, Va.	Special Registered Compound	Richfield	R	5.93	2.00	7.93	7.93	.72	1.62	2.34	1.08	13.52		
5424	Va-Car. Chemical Co., Richmond, Va.	Beef Blood and Bone	Statesville	R	4.63	3.38	8.01	8.01	.56	1.44	2.00	.89	14.71		
Brands claiming															
5555	Acme Mfg. Co., Wilmington, N. C.	Acme Special Grain Fertilizer	Jonesboro	R	6.88	1.87	8.75	8.75	.06	2.12	2.18	2.11	18.49		
5554	do	Gem Fertilizer	Jonesboro	D	6.70	1.84	8.54	8.54	.06	2.16	2.22	2.00	17.21		
5522	American Agricultural Chemical Co., New York.	Lazarotto Crop Grower	Hickory	R	6.65	1.85	8.50	8.50	.86	1.34	2.20	2.10	17.22		
5557	American Fertilizer Co., Norfolk, Va.	Bone and Peruvian Guano	Rural Hall	R	4.13	5.07	9.20	9.20	.78	1.02	1.80	1.60	15.98		
5495	Armour Fertilizer Works, Wilmington, N. C.	Armour's General Fertilizer	Taylorsville	R	5.45	4.54	9.99	9.99	1.20	.65	1.86	2.06	17.39		
5433	Ashepool Fertilizer Co., Charleston, S. C.	Carolina Guano	Mooresville	S	6.30	3.04	9.34	9.34	1.04	1.18	2.22	2.31	18.27		
5420	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Bone and Potash Compound.	High Point	S	6.40	2.06	8.46	8.46	1.10	1.18	2.28	2.33	17.69		
5425	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Fertilizer	Statesville	R	4.15	3.63	7.78	7.78	.80	1.56	2.36	2.27	17.28		
5523	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano	Hickory	R	6.38	2.10	8.28	8.28	1.10	.82	1.92	2.11	16.10		
5503	do	Columbia Special Wheat Fertilizer.	Siler City	S	6.68	1.76	8.44	8.44	1.04	.96	2.00	2.16	16.57		
5422	Etiwan Fertilizer Co., Charleston, S. C.	Plow Brand Ammoniated Fertilizer.	Salisbury	S	3.23	4.10	7.33	7.33	1.12	1.40	2.52	1.71	16.79		
5492	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Statesville	D	6.63	2.13	8.81	8.81	.90	1.26	2.16	3.05	18.41		
5471	Imperial Company, Norfolk, Va.	Imperial Champion Guano	Thomasville	R	8.00	1.40	9.40	9.40	.68	1.56	2.24	2.15	17.89		
5514	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Success Fertilizer	Siler City	R	3.60	3.71	7.31	7.31	.76	1.46	2.22	2.01	16.11		
5493	Navassa Guano Co., Wilmington, N. C.	Navassa Grain Fertilizer	Taylorsville	R	6.10	2.92	9.02	9.02	.92	1.08	2.00	2.39	17.34		

55271	Petapasco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano	S	5.35	2.70	8.05	.76	1.46	2.22	2.12	16.90
55292	Powhatan Chemical Co., Richmond, Va.	Magic Special Fertilizer	R	7.20	1.82	9.02	1.38	1.06	2.44	2.01	18.38
5534	Richmond Guano Co., Richmond, Va.	Premium Brand Fertilizer	R	5.35	2.22	7.57	.72	1.18	1.90	3.03	16.41
5537	Royster, F. S., Guano Co., Norfolk, Va.	Farmers Bone Fertilizer	B	5.99	3.06	8.05	1.36	.76	2.12	2.00	16.44
5505	Tuscarora Fertilizer Co., Baltimore, Md.	Standard Liberty	S	5.90	4.80	10.30	.96	.80	1.76	2.09	17.37
5421	Union Guano Co., Winston, N. C.	Old Honest Guano	R	6.68	2.36	8.04	1.34	.94	2.28	2.34	18.23
5462	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Fertilizer	R	5.25	3.04	8.29	.72	1.28	2.00	1.67	15.89
5511	do	Atlantic Fertilizer Co.'s Eureka Hickory Ammoniated Bone	R	4.95	2.99	7.94	.74	1.42	2.16	2.45	16.96
5434	do	Davie & Whittle's Owl Brand Guano	S	5.48	3.02	8.50	.70	1.30	2.00	2.00	16.45
5436	do	Durham Fertilizer Co.'s Genuine Charlotte	S	5.50	3.57	9.07	.80	1.14	1.94	2.17	16.95
5525	do	Bone and Peruvian Guano	S	5.10	2.94	8.04	.64	1.52	2.16	2.12	16.69
5481	do	Old Dominion Guano Co.'s Farmers' Friend Fertilizer	R	5.35	3.17	8.52	.78	1.18	1.96	2.36	16.73
5512	do	Old Dominion Guano Co.'s Soluble Guano	R	5.10	2.87	7.97	.30	2.22	2.52	1.87	17.54
5511	do	Plant Food	R	3.43	5.06	8.49	.98	1.18	2.16	2.01	16.93
do	do	Travers & Co.'s National Fertilizer	R	6.28	1.97	8.25	.86	1.76	2.62	2.08	18.35
do	do	Bone Phosphate	R	6.28	1.97	8.25	.86	1.76	2.62	2.08	18.35
5549	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	R Y	7.03	2.12	9.15	.76	1.48	2.24	1.59	17.37
5482	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Ammoniated Dissolved Bone Phosphate	R	6.28	1.97	8.25	.86	1.76	2.62	2.08	18.35
5544	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s N. C. Official Farmers' Alliance Guano	S Y	6.55	2.09	8.64	.76	2.04	2.80	2.23	19.46
5552	Acme Mfg. Co., Wilmington, N. C.	Acme Fertilizer for Tobacco	R	7.48	1.17	8.65	1.14	1.80	2.94	3.13	20.92
5484	Baugh & Sons Co., Norfolk, Va.	Grand Rapid Guano	R	6.45	2.20	8.65	.86	2.20	3.06	3.01	21.19
5524	Royster, F. S., Guano Co., Norfolk, Va.	Marlboro High Grade Cotton Grower	R	6.78	1.64	8.42	1.16	1.38	2.54	3.36	19.65
5556	Navassa Guano Co., Wilmington, N. C.	Navassa Special Truck Guano	S P	7.30	1.50	8.80	1.78	1.30	3.08	4.43	22.95
5532	Chickamauga Fertilizer Works, Chattanooga, Tenn.	Chickamauga Blood and Bone	S	6.08	4.20	10.28	.80	1.00	1.80	1.58	16.93
5547	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Standard Guano	S Y	8.08	2.04	9.00	.88	1.40	2.28	2.01	18.84
5548	Va.-Car. Chemical Co., Richmond, Va.	Cocke's High-grade Animal Bone Soluble Guano	R	7.55	2.31	9.00	.82	1.34	2.16	3.21	19.53
5446	Bradley Fertilizer Co., Boston, Mass.	B. D. Sea Fowl Guano	R	6.73	2.80	9.00	1.10	1.40	2.50	1.78	18.78

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.								Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.		
MIXED FERTILIZERS.													
Brands claiming													
5474	Imperial Co., Norfolk, Va.	Imperial Yarkin Wheat Grower Bone and Potash	Thomasville	R	8.40	1.64	8.00					2.00	\$ 9.40
5459	Reidsville Fertilizer Co., Reidsville, N. C.	do	Reidsville	R	4.30	3.20	10.04					2.32	11.58
Brand claiming													
5412	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s McCavock Special Potash Mixture.	Greensboro	S	3.93	4.57	8.50					2.25	9.35
Brands claiming													
5449	American Fertilizer Co., Norfolk, Va.	American Special Potash Mixture for Wheat.	Charlotte	S	2.33	4.60	6.93					4.00	11.60
5559	do	do	Rural Hall	R	4.15	4.77	8.92					4.05	10.69
5473	Norfolk Fertilizer Co., Norfolk, Va.	Sparger's Grain Grower	Thomasville	R	8.68	1.65	10.33					3.43	11.80
5457	Union Guano Co., Winston, N. C.	Union Wheat Mixture	Reidsville	R	3.10	5.20	8.30					4.08	13.78
5537	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Carr's Special Wheat Grower.	Charlotte	R	3.35	5.08	8.43					3.06	10.83
5547	do	do	Asheville	R	3.04	4.86	7.90					4.41	12.43
5447	Brand claiming	do	do	R	3.04	4.86	7.90					4.13	11.65
5437	Armour Fertilizer Works, Wilmington, N. C.	Armour's Phosphate and Potash Fertilizer.	Charlotte	S	8.68	1.58	10.26					5.00	12.70
5450	American Fertilizer Co., Norfolk, Va.	Dissolved Bone and Potash for Corn and Wheat.	Charlotte	R	4.00	5.10	10.00					3.44	13.01
5487	Armour Fertilizer Works, Wilmington, N. C.	Armour's Phosphate-Potash Fertilizer.	Concord	R	7.98	2.22	10.20					2.00	10.39
5438	Ashepoo Fertilizer Co., Charleston, S. C.	Enoree Acid Phosphate and Potash.	Mooreville	R	9.68	3.00	12.68					2.00	10.39
5535	Atlantic Chemical Co., Norfolk, Va.	Atlantic Bone and Potash Mixture.	Hickory	R	8.08	2.05	10.13					1.91	11.28
5409	Baugh & Sons Co., Norfolk, Va.	Baugh's Soluble Alkaline Superphosphate.	Hillsboro	R	3.93	5.92	9.85					1.86	13.56
5410	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Electric Bone and Potash Mixture.	Hillsboro	R	6.30	3.37	9.67					2.05	11.37
5535	Chickamauga Fertilizer Works, Chattanooga, Tenn.	Chickamauga Bone and Potash.	Morganton	R	5.20	6.49	11.69					2.01	11.07
												1.81	10.69
												2.16	12.89

5515	Norfolk Fertilizer Co., Norfolk, Va.	Young's Grain Grower	Siler City	S	12.05	2.31	14.36	1.85	14.96
5528	Patapsco Guano Co., Baltimore, Md.	Patapsco Soluble Bone and Potash.	Granite Falls	R	7.75	2.44	10.19	2.11	11.49
5538	Richmond Guano Co., Richmond, Va.	Bone and Potash Mixture	Asheville	R	5.95	4.07	10.02	2.00	11.21
5411	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Hillstoro.	R	8.40	2.18	10.62	1.75	11.48
5550	Swift's Fertilizer Works, Atlanta, Ga.	Swift's Wheat Grower	Bryson City	R	6.50	4.00	10.50	2.03	11.59
5508	Tuscarora Fertilizer Co., Wilmington, N. C.	Bone and Potash	Liberty	S	8.50	3.12	11.62	3.01	13.76
5413	Union Guano Co., Winston, N. C.	Union Bone and Potash	Greensboro	S	7.45	3.90	11.15	1.87	12.09
5517	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's B. P. Potash Mixture.	Wauhtown	R	2.53	7.73	10.26	1.67	11.07
5465	do	Davie & Whittle's Owl Brand Acid Phosphate with Potash.	Norwood	R	5.98	4.60	10.58	4.16	14.09
5490	do	Old Dominion Guano Co.'s H. G. Alkaline Bone.	China Grove	R	5.03	4.85	9.88	2.39	11.52
5458	do	Southern Chemical Co.'s Winston Bone and Potash Comp.	Reidsville	S	5.93	4.68	10.61	1.94	11.68
5448	do	Travers & Co.'s Capital Bone and Potash Compound.	Charlotte	R	4.93	4.81	9.74	2.00	10.96
5558	do	do	Clemmons	R	3.00	7.01	10.01	2.08	11.29
5476	Brands claiming Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Morris & Scarboro's Special Bone and Potash Mixture for Wheat.	Ashboro	S	8.73	3.44	10.17	3.00	12.20
5506	Norfolk Fertilizer Co., Norfolk, Va.	Shenandoah Wheat Mixture	Bear Creek	R	8.43	1.81	10.24	3.35	12.90
5477	Brands claiming	Giant Phosphate and Potash	Ashboro	R	4.43	5.82	9.75	3.51	12.63
5497	Armour Fertilizer Works, Wilmington, N. C.	Armour's Superphosphato and Potash Fertilizer.	Taylorsville	R	8.33	1.60	10.00	4.00	13.40
5488	Baugh & Sons Co., Norfolk, Va.	Baugh's H. G. Potash Mixture	Concord	R	4.75	5.21	9.96	3.80	13.11
5460	Reidsville Fertilizer Co., Reidsville, N. C.	Bone and Potash	Reidsville	R	5.63	3.31	8.94	4.02	13.38
5507	Tuscarora Fertilizer Co., Wilmington, N. C.	Alkaline	Liberty	R	8.45	1.48	9.93	4.15	12.61
5429	Union Guano Co., Winston, N. C.	Quaker Grain Mixture	Salisbury	S	7.73	3.82	11.55	4.03	13.36
5509	do	Union 12-3 Bone and Potash	Liberty	S	8.90	2.41	11.31	2.88	13.56
5489	Va.-Car. Chemical Co., Richmond, Va.	Va. State Fertilizer Co.'s XX Potash Mixture.	China Grove	R	5.23	4.36	9.59	3.55	14.08
5551	do	V. C. Co.'s Special Potash Mixture.	Charlotte	D	7.28	3.90	11.18	4.00	13.03
								3.63	14.05

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1906—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.							Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.		Total Potash.
RAW OR UNMIXED FERTILIZER MATERIALS.												
5480	Brand claiming Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Dandy Caraleigh Acid Phosphate	Ashboro	R	7.33	4.40	10.00	11.70				\$ 8.00 9.36
	Brands claiming Columbia Guano Co., Norfolk, Va.	Columbia Acid Phosphate	Kernersville	R	10.03	3.44	12.00	13.52				9.60
	Royster, F. S., Guano Co., Norfolk, Va.	XX Acid Phosphate.	Richfield	R	9.65	3.56	13.21	13.21				10.56
	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate.	Salisbury	R	6.48	5.70	12.18	12.18				9.74
5500	Brands claiming Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Sterling High Grade Acid Phosphate.	Statesville	R	13.78	2.01	13.00	15.79				10.40 12.63
	Etiwan Fertilizer Co., Charleston, S. C.	Diamond Soluble Bone	Hillsboro	R	10.38	3.57	13.95	13.95				11.16
	Farmers Guano Co., Raleigh, N. C.	Farmers' High Grade Acid Phosphate.	Statesville	D	12.43	3.16	15.59	15.59				12.47
	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Dissolved Bone.	Gulf	R	12.20	3.92	16.12	16.12				12.89
5541	Richmond Guano Co., Richmond, Va.	Premium Dissolved Bone	Asheville	R	5.48	6.22	11.70	11.70				9.36
5518	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade Dissolved Bone.	Siler City	R	10.10	3.40	13.50	13.50				10.80
5560	Swift's Fertilizer Works, Atlanta, Ga.	Swift's Harrow High Grade Acid Phosphate.	Rural Hall	R	8.88	4.94	13.82	13.82				11.05
5479	Union Guano Co., Winston, N. C.	Union Dissolved Bone	Thomasville	R	9.75	3.58	13.33	13.33				10.66
5414	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's I X L Acid Phosphate.	Durham	S	8.30	4.97	13.27	13.27				10.61
5530	do	Davie & Whittle's Owl Brand Acid Phosphate.	Lenoir	D	7.83	5.79	13.62	13.62				10.89
5453	do	Durham Fertilizer Co.'s High Grade Acid Phosphate.	Statesville	R	9.88	3.61	13.49	13.49				11.79
5467	do	Old Dominion Guano Co.'s High Grade Bone Phosphate.	Norwood	R	8.98	4.06	13.04	13.04				11.73
5519	do	Tinsley & Co.'s Dissolved S. C. Bone.	Kernersville	R	9.75	3.90	13.65	13.65				10.92

[illegible]

* Total Phosphoric Acid found, 21.38, valued at 3½ cents per pound.

[†]Total Phosphoric Acid found, 22.90, valued at 3½ cents per pound.

† Total Phosphoric Acid found, 21.08, valued at 3½ cents per pound.

N, D, K, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—very coarse, lumpy, and very damp.

W--wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1907.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.																
Brands claiming																
6015	American Agricultural Chemical Co., New York.	Zell's Ammoniated Bone-	Lexington	R	4.53	3.49	8.00	1.32	.68	2.00	1.00	---	---	---	\$ 14.90	
5937	Ashpoo Fertilizer Co., Charleston, S. C.	P. D. Fertilizer	Lexington	R	7.38	2.52	9.90	1.22	.82	2.04	1.36	---	---	---	15.08	
6122	Atlantic Chemical Co., Norfolk, Va.	Atlantic Special Guano	Roxboro	D	6.65	1.59	8.24	.82	1.38	2.20	.93	---	---	---	17.13	
5880	Baugh & Sons Co., Norfolk, Va.	Baugh's Double Eagle Phosphate.	Edenton	R	2.55	5.18	7.73	1.06	1.32	2.38	1.37	---	---	---	15.70	
6163	Navassa Guano Co., Wilmington, N. C.	Navassa Complete Fertilizer	Salem	R	6.53	1.91	8.44	.86	1.18	2.04	1.34	---	---	---	16.30	
6111	Powhatan Chemical Co., Richmond, Va.	Magic Guano Mixture	Senora	D	7.25	1.80	9.05	1.06	.94	2.00	2.95	---	---	---	15.80	
6094	Reidsville Fertilizer Co., Reidsville, N. C.	Banner Fertilizer	Reidsville	D	4.38	2.89	7.27	.64	1.38	2.02	1.47	---	---	---	17.81	
5998	Royster, F. S., Guano Co., Norfolk, Va.	Special Compound	Henderson	R	6.68	1.54	8.22	.86	1.00	1.86	1.14	---	---	---	14.83	
5896	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s Queen of the Harvest.	Goldsboro	R	6.33	.84	7.17	.94	1.30	2.24	1.42	---	---	---	14.79	
6057	---do---	Durham Fertilizer Co.'s Durham Ammoniated Fertilizer.	Gold Hill	R	4.70	2.96	7.66	.70	1.80	2.50	1.10	---	---	---	15.41	
5836	---do---	Travers & Co.'s Beef Blood and Bone.	Edenton	S	5.43	2.24	7.67	1.18	1.24	2.42	1.90	---	---	---	16.35	
Brands claiming																
5832	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	Elizabeth City	R	4.63	2.77	8.00	1.04	1.50	2.00	1.50	---	---	---	16.98	
5805	Imperial Co., Norfolk, Va.	Imperial Cotton Grower	Windsor	R	6.78	1.27	8.05	.96	1.86	2.88	2.28	---	---	---	15.45	
6159	---do---	Standard Premium Guano	Washington	R	6.85	1.47	8.32	.52	1.74	2.26	1.89	---	---	---	17.04	
Brands claiming																
6160	Armour Fertilizer Works, Wilmington, N. C.	King Cotton	Rose Hill	D	6.20	1.60	8.00	1.20	1.22	2.50	1.00	---	---	---	19.23	
5717	Va.-Car. Chemical Co., Richmond, Va.	Travers & Co.'s Capital Cotton Fertilizer.	Whiteville	R	5.10	2.35	7.45	1.10	1.54	2.64	2.38	---	---	---	16.55	
							7.80	1.20	1.22	2.42	1.48	---	---	---	16.63	
							7.45	1.10	1.54	2.64	2.38	---	---	---	18.03	

Brands claiming	Cotton-seed Meal Guano	Arden	8.00	2.00	2.00	2.00	16.00
5572 Acme Mfg. Co., Wilmington, N. C.		R	1.55	1.28	2.14	2.15	16.78
5824 do American Agricultural Chem. Co., New York.	Gem Fertilizer	Wilmington	2.18	.66	2.06	2.30	16.73
6016 do do	Lazaretto Crop Grower	Lexington	2.32	.56	1.94	2.01	15.81
5581 do do	Triumph Soluble Guano	Edenton	2.69	.86	2.10	1.98	16.84
6034 do do	Zell's Calvert Guano	Creedmoor	3.30	1.02	2.38	2.00	16.86
5728 do do	Zell's Fish Guano	Fremont	5.08	.74	2.24	2.29	18.44
5764 American Fertilizer Co., Norfolk, Va.	American Cotton Compound	Edenton	5.35	1.44	2.56	1.91	17.15
5632 do do	Bone and Peruvian Guano	Edenton	5.95	.68	2.54	2.17	18.21
6084 do do	Hannah's Special Formula Guano.	Reidsville	4.48	.64	2.14	1.98	17.12
5681 Armour Fertilizer Works, Wilmington, N. C.	Armour's General Fertilizer	New Bern	2.06	.08	2.20	1.55	17.56
5630 Arps, Geo. L., & Co., Norfolk, Va.	Arps' Big Yield Guano	Edenton	5.23	1.48	2.28	2.38	16.91
5967 Ashpoo Fertilizer Co., Charleston, S. C.	High Grade Premium Guano	Edenton	4.55	1.40	2.40	2.27	17.30
5938 do do	Carolina Guano	Lexington	6.33	.92	2.22	2.08	17.64
5956 Atlantic Chemical Co., Norfolk, Va.	Atlantic Soluble Guano	Mt. Olive	7.38	1.02	2.06	1.75	16.52
5850 Bailey, J. L., Elm City, N. C.	Stag Brand Fertilizer	Elm City	7.55	1.46	3.38	2.47	21.98
5573 Baugh & Sons Co., Norfolk, Va.	Baugh's Fish Mixture	Elizabeth City	2.15	.58	2.28	2.57	18.63
5562 do do	Baugh's Animal and Bone Potash Compound.	Washington	2.09	.64	2.12	2.10	16.97
5829 Berkley Chemical Co., Norfolk, Va.	Brandon Superphosphate	Spring Hope	2.58	1.02	2.26	2.20	17.53
5649 Bragaw, Wm. & Co., Washington, N. C.	Old Reliable Premium High Grade for all Crops.	Washington	5.08	.84	2.22	1.98	16.63
5647 do do	Tar Heel Special Guano for all Crops.	Washington	5.10	.96	2.22	2.03	16.65
6119 Blackstone Guano Co., Blackstone, Va.	Alliance Guano	Woodsdale	5.78	1.40	2.14	1.09	17.39
6124 do do	Red Letter	Roxboro	5.38	1.62	2.50	2.00	18.52
5742 Burton, C. J., Guano Co., Baltimore, Md.	Burton's Butcher Bone	Fremont	5.53	1.54	2.18	2.02	16.83
5943 do do	do	Washington	5.78	1.68	2.38	2.48	17.90
5814 Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Guano	Spring Hope	8.10	.94	1.80	2.12	16.82
5580 Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano	Edenton	6.83	1.41	2.02	2.00	16.28
6149 Concentnea Guano Co., Wilson, N. C.	Woodard's Blood and Bone Compound.	Lucama	6.25	.46	2.32	2.64	17.97
5926 Crow Fertilizer Co., Monroe, N. C.	Crow's Union Co. Special Cotton Fertilizer.	Monroe	7.18	.30	2.20	2.35	17.75

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ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1907—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
					Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Phosphoric Acid.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.																
6152	Farmers' Cotton Oil Co., Wil-son, N. C.	Crop King Guano	Lucama	R	6.10	2.05	8.15	1.12	.96	2.08	2.19					\$ 16.61
5727	do	Farmer's Special Guano	Fremont	D	6.85	1.12	7.97	1.12	.98	2.10	2.43					16.77
5969	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Youngsville	S	8.70	1.14	9.84	.84	.68	1.52	1.72					15.76
5747	Hadley, Harris & Co., Wilson, N. C.	Daisy Fish Mixture	Wilson	R	7.30	1.43	8.73	1.12	1.06	2.18	2.44					17.73
7546	do	Hadley's Special H. G. Plant Food.	Wilson	R	6.40	.94	7.34	.56	1.64	2.20	3.05					17.22
6087	Hampton Guano Co., Norfolk, Va.	Shirley Superphosphate	Reidsville	R	5.25	2.79	8.04	.74	1.40	2.14	1.97					16.47
5587	Harrell, S. B. & Co., Norfolk, Va.	Harrell's Champion Cotton and Peanut Grower.	Edenton	R	7.43	1.69	9.12	.58	1.48	2.06	2.02					17.22
5623	Hubbard Fertilizer Co., Balti-more, Md.	Hubbard's Exchange Guano	Washington	R	3.25	4.44	7.69	.94	1.10	2.04	2.14					15.89
5804	Imperial Co., Norfolk, Va.	Imperial Ciscu Soluble Guano.	Ahokie	R	6.95	1.49	8.44	.94	1.68	2.12	2.46					17.30
5763	do	Imperial Special Peanut and Corn Guano.	Edenton	S	7.28	1.53	8.81	.50	1.60	2.10	2.44					17.54
5756	do	Imperial Champion Guano	Washington	R	8.50	1.02	9.52	.40	1.32	1.72	2.21					16.67
5914	Lister's Agricultural Chemical Co., Newark, N. J.	Lister's Success Fertilizer	Monroe	S	5.33	2.67	8.00	.68	1.32	2.00	2.00					16.00
5690	Martin, D. B. Co., Philadelphia, Pa.	Martin's Carolina Cotton Fer-tilizer.	Goldsboro	S	5.78	1.93	7.71	.92	1.58	2.50	2.22					17.63
5976	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Cotton Guano	Hobgood	R	5.43	3.04	8.47	.72	1.28	2.09	2.37					16.83
5735	Miller Fertilizer Co., Baltimore, Md.	Ammoniated Dissolved Bone	Fremont	R	5.48	2.88	8.36	1.88	.74	2.50	2.16					17.60
6109	do	Farmers' Profit	Senora	R	4.23	3.52	7.75	1.74	.76	2.22	2.04					17.09
5720	Navassa Guano Co., Wilmington, N. C.	Ammoniated Soluble Navassa Guano.	Whiteville	R	5.18	1.61	6.79	1.46	1.56	3.02	2.49					18.81
5902	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton Fertilizer	Clinton	D	5.88	2.04	7.92	1.34	.84	2.18	2.04					16.56
5867	do	Navassa Cotton Seed Meal Guano.	Teachey	R	6.90	1.15	8.05	.58	1.92	2.50	2.06					17.76
5947	New Bern Cotton Oil and Ferti-lizer Mills, New Bern, N. C.	Craven County Cotton Guano	Pantego	R	6.83	1.37	8.20	.64	1.66	2.30	2.51					17.73

6002	N. C. Cotton Oil Co., Charlotte, N. C.	Majestic Fertilizer	China Grove	D	6.30	2.23	8.53	.14	2.00	2.14	2.28	---	---	17.25
5929	N. C. Cotton Oil Co., Henderson, N. C.	Henderson Cotton Grower	Wake Forest	D	7.13	2.06	9.19	.22	1.91	2.16	2.77	---	---	18.45
5785	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Cotton Grower	Warsaw	D	7.73	1.17	8.90	.02	2.04	2.06	2.52	---	---	17.78
5781	do	Wilmington Special	Maxton	R	6.53	2.44	8.97	.70	1.52	2.22	2.60	---	---	18.25
5812	Ober, G. & Sons Co., Baltimore, Md.	Ober's Special Cotton Com-pound.	Spring Hope	R	7.95	1.05	9.00	1.06	1.10	2.16	2.28	---	---	17.74
5932	do	Standard Tobacco Fertilizer	Oxford	R	7.80	.92	8.72	1.04	1.06	2.10	2.52	---	---	17.55
5884	Pataspco Guano Co., Baltimore, Md.	Planters Favorite	Enfield	R	5.73	2.33	8.06	.74	1.25	2.00	2.10	---	---	16.16
5677	do	Sea Gull Ammoniated Guano	LaGrange	R	5.83	2.69	8.52	.82	1.24	2.06	1.96	---	---	16.62
5827	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Cultivator Brand	Spring Hope	R	5.78	2.16	7.94	1.34	1.20	2.54	2.24	---	---	16.99
5852	do	Piedmont Special	Elm City	R	6.83	2.14	8.97	.50	1.36	1.86	2.04	---	---	16.45
5950	Pine Level Oil Mills, Pine Level, N. C.	Cotton Grower for all Crops	Selma	D	6.40	1.83	8.23	1.06	1.91	3.00	2.88	---	---	20.47
5854	Pine Top Supply Co., Pine Tops, N. C.	Pine Top Standard	Pine Tops	R	6.85	2.16	9.01	.42	1.52	1.94	2.88	---	---	17.68
6017	Pocahontas Guano Co., Lynchburg, Va.	Carrington Banner Guano	Thomasville	D	5.73	2.29	8.02	.62	1.34	1.96	2.14	---	---	16.04
5618	Pocomoke Guano Co., Norfolk, Va.	Pamlico Superphosphate	Washington	S	6.88	2.01	8.89	.88	1.32	2.20	1.89	---	---	17.34
5566	do	Pocomoke Superphosphate	Mackey's Ferry	R	6.10	2.02	8.72	.96	1.04	2.00	1.89	---	---	16.52
5683	Powhatan Chemical Co., Richmond, Va.	Magic Cotton Grower	New Bern	S	4.70	2.84	7.54	2.34	.18	2.52	2.18	---	---	17.50
5997	do	Magic Special Fertilizer	Henderson	R	6.40	2.42	8.82	1.02	1.14	2.16	2.40	---	---	17.70
6110	do	Magic Tobacco Grower	Semora	R	6.13	1.79	7.92	1.00	1.04	2.04	2.60	---	---	16.72
5993	Itasin-Monumental Co., Baltimore, Md.	Rasin Empire Guano	Fairmont	N	5.68	.93	6.61	1.28	.68	1.96	1.70	---	---	14.28
6092	Reidsville Fertilizer Co., Reidsville, Va.	Champion Guano	Reidsville	D	4.23	2.83	7.06	.64	1.78	2.42	1.90	---	---	16.43
6073	Richmond Guano Co., Richmond, Va.	Edgecombe Cotton Grower	Troy	N	7.50	1.62	9.12	.38	1.82	2.20	1.89	---	---	17.35
5715	do	Premium Brand Fertilizer	Edenton	S	5.48	3.41	8.89	.98	1.12	2.10	1.96	---	---	17.09
5963	do	Premium Tobacco Fertilizer	Louisburg	R	6.13	1.61	7.74	1.16	1.92	3.68	3.16	---	---	20.60
5610	Royster, F. S., Guano Co., Norfolk, Va.	Farmers Bone Fertilizer	Edenton	S	7.10	1.20	8.30	1.44	.68	2.12	2.15	---	---	16.83
5833	Savare, Son & Co., Norfolk, Va.	Purity Guano	Edenton	R	6.58	1.96	8.54	.78	1.34	2.12	2.03	---	---	16.92
5825	Southern Cotton Oil Co., Fayetteville, N. C.	Fayetteville Oil Mill Standard	Spring Hope	R	7.45	2.65	10.10	.14	1.44	1.58	2.41	---	---	16.96
6181	do	do	Jonesboro	D	6.95	1.73	8.68	.68	1.50	2.18	2.43	---	---	17.68
5985	Southern Cotton Oil Co., Monroe, N. C.	Gloria Fertilizer	Monroe	R	6.05	2.25	8.30	.24	1.60	1.84	2.55	---	---	16.35
6170	Statesville Oil and Fertilizer Co., Statesville, N. C.	Grasoli Ammoniated Guano	Mooreville	D	6.78	2.10	8.88	.36	2.08	2.44	2.38	---	---	18.66
6113	Tuscarora Fertilizing Co., Buena Vista, Va.	Tuscarora	Woodsdale	D	3.35	4.88	8.23	.86	1.30	2.16	2.17	---	---	16.92

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1907—CONTINUED.

Percentage Composition or Parts Per 100.																
Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.	Relative Value per Ton at Factory.	
MIXED FERTILIZERS.																
5731	Union Guano Co., Winston, N. C.	Old Honesty Guano.	Fremont	R	5.25	2.08	7.33	1.04	.96	2.00	2.06	---	---	---	\$ 15.46	
5831	Upshur, R. L., Norfolk, Va.	Upshur's Grass, Grain and Corn Guano.	Edenton	R	6.83	1.54	8.37	.80	1.62	2.42	2.22	---	---	---	17.96	
5817	Va.-Car. Chemical Co., Richmond, Va.	do	Nashville	D	7.28	2.71	9.99	.10	1.66	1.76	2.25	---	---	---	17.27	
5734	do	Allison & Addison's Anchor Brand Fertilizer.	Warsaw	R	7.33	.93	8.26	.28	1.72	2.00	1.94	---	---	---	16.17	
5760	do	Atlantic and Virginia Fertilizer Co.'s Eureka.	Elizabeth City	R	4.05	2.05	7.10	1.18	1.42	2.60	2.27	---	---	---	17.47	
5999	do	Charlotte Oil and Fertilizer Co.'s King Cotton.	Henderson	D	5.73	2.27	8.00	.22	1.78	2.00	2.07	---	---	---	16.07	
5617	do	Davie & White's Owl Brand	Greenville	S	6.40	2.05	8.45	1.08	1.74	2.82	2.23	---	---	---	19.35	
5954	do	Diamond Dust	Selma	R	7.08	2.18	9.26	.34	1.48	1.82	1.33	---	---	---	15.80	
5642	do	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Washington	R	5.93	2.33	8.26	.56	1.58	2.14	2.52	---	---	---	17.26	
5691	do	Farmers Favorite Fertilizer	Goldsboro	R	6.28	2.14	8.42	.14	1.88	2.02	2.40	---	---	---	16.88	
5644	do	Norfolk and Carolina Genuine Slaughter-house Bone Guano.	Washington	R	5.58	2.47	8.05	.70	1.60	2.30	2.80	---	---	---	17.91	
5575	do	Old Dominion Farmer's Friend Fertilizer.	Hertford	D	6.15	1.87	8.02	.92	1.66	2.58	2.67	---	---	---	18.67	
5595	do	Old Dominion Soluble Guano	Washington	R	6.43	2.14	8.57	1.46	1.72	3.18	2.59	---	---	---	21.05	
6182	do	Plant Food	Battleboro	D	6.48	2.62	9.10	.40	1.82	2.22	2.88	---	---	---	18.68	
5692	do	Powers, Gibbs & Co.'s Eagle Island Ammoniated Guano.	Goldsboro	D	5.88	2.14	8.02	.70	1.32	2.02	2.26	---	---	---	16.37	
6164	do	Southern Chemical Co.'s Electric Standard Guano.	Winston-Salem	R	6.03	1.68	7.71	1.08	1.32	2.40	2.57	---	---	---	17.69	
6038	do	Southern Chemical Co.'s Electric Tobacco Guano.	Gibsonville	R	4.73	2.41	7.14	.56	1.44	2.00	2.25	2.25	6.90	---	15.50	
6090	do	Tinsley & Co.'s Lee Brand Guano.	LaGrange	R	6.53	2.41	8.94	.64	1.38	2.02	2.22	---	---	---	17.15	
5579	do	Tinsley & Co.'s Stonewall Guano.	Edenton	R	6.03	2.07	8.10	1.10	1.40	2.50	2.13	---	---	---	17.88	

5631	---do---	Travers' National Fertilizer	Edenton	5.98	2.30	8.28	.96	1.54	2.50	2.18	---	18.08
5813	---do---	Virginia State Fertilizer Co.'s High Grade Guano.	Spring Hope	5.20	2.16	7.36	1.46	1.36	2.82	1.99	---	18.12
6108	---do---	Virginia State Fertilizer Co.'s High Grade Tobacco Guano.	Semora	4.55	3.46	8.01	.72	1.28	2.00	2.05	2.60	16.07
5695	---do---	Wilson Standard Guano	Goldsboro	6.55	.59	7.14	.74	1.28	2.02	2.54	---	15.89
5853	---do---	Winston Special for Cotton	Nashville	7.18	2.42	9.60	.10	1.68	1.78	2.87	---	17.87
5813	Winborne Guano Co., Tyner, N. C.	High Grade Excelsior Guano	Edenton	6.83	1.17	8.00	.62	1.86	2.42	2.54	---	17.98
6143	---do---	High Grade Triumph Guano	Edenton	6.48	2.32	8.80	1.44	.44	1.88	2.00	---	16.32
	Brands claiming	Latimer's Complete Fertilizer	Laurel Hill	6.28	2.14	8.42	1.52	1.06	2.50	2.00	---	17.65
5858	Acme Mfg. Co., Wilmington, N. C.	Lazaretto Universal Compound	Wilson	5.60	2.48	8.08	1.00	1.78	2.78	2.04	---	18.44
5794	American Agricultural Chem. Co., New York.	Armour's King Cotton Fertilizer No. 2.	Wilson	5.85	1.92	7.77	1.36	1.40	2.76	2.76	---	18.67
5789	Armour Fertilizer Works, Wilmington, N. C.	Eclipse Ammoniated Guano	Morrisville	7.38	1.65	9.03	1.38	1.08	2.46	2.60	---	19.13
6032	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Columbia Special Tobacco Grower.	Henderson	6.73	1.67	8.40	1.50	1.06	2.56	2.12	2.12	19.10
5935	Va.	Lister's Ammoniated Dissolved Bone Phosphate.	Wilson	5.43	2.39	7.82	.74	1.74	2.48	1.78	---	18.32
5845	Works, Newark, N. J.	Navassa Guano for Tobacco	Louisburg	6.95	1.83	8.78	1.10	1.40	2.50	2.00	2.00	17.18
5930	N. C.	Cooper's Pungo Guano	Creedmoor	7.93	1.41	9.34	.80	1.70	2.50	2.30	---	18.35
6033	Ohio, G. & Sons Co., Baltimore, Md.	Black Hawk Brand	Ruffin	6.38	1.94	8.32	.96	1.58	2.54	2.39	---	19.18
6102	Poehontas Guano Co., Lynchburg, Va.	Va.-Car. Chemical Co.'s Genuine Slaughter-House Bone for Tobacco.	Monroe	6.73	1.63	8.36	2.18	1.22	3.40	2.06	2.06	18.50
5915	Va.-Car. Chemical Co., Richmond, Va.	Va. State Fertilizer Co.'s Australian Tobacco Grower.	Semora	4.83	4.69	9.52	1.06	1.52	2.58	2.00	2.00	21.01
6107	---do---	Va. State Fertilizer Co.'s G. E. Special Tobacco Grower.	Wilson	5.53	1.78	7.31	1.52	1.40	2.92	1.99	1.99	19.28
5796	---do---	Slingluff's British Mixture	Roxboro	5.85	2.65	8.50	1.04	1.50	2.50	2.50	---	18.41
6120	Brands claiming American Agricultural Chem. Co., New York.	Bob White Fertilizer for Tobacco.	Nashville	6.70	1.76	8.46	1.38	1.12	2.50	2.12	2.12	18.20
5816	American Fertilizer Co., Norfolk, Va.	Armour's Champion Fertilizer	Stovall	6.60	2.21	8.81	1.12	1.02	2.14	2.49	---	18.92
6031	Armour Fertilizer Works, Wilmington, N. C.	Meadows' All Crop Guano	Dover	5.20	3.53	8.73	.94	1.60	2.54	2.94	---	18.19
5668	Meadows, E. H. & J. A. Co., New Bern, N. C.	Tuscarora Champion	Smithfield	6.73	1.71	8.44	1.14	1.12	2.26	3.38	---	17.73
5911	Tuscarora Fertilizer Co., Wilmington, N. C.	Camp's Prepared Chemicals	Edenton	4.23	3.83	8.06	3.66	.70	2.75	2.00	---	19.47
6055	Brands claiming Camp, W. H., Petersburg, Va.								4.36	2.76	---	18.47

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5554	Armour Fertilizer Works, Baltimore, Md.	Armour's Sweet Potato Special Fertilizer.	Elizabeth City.	R	6.68	1.58	8.26	1.22	1.72	2.94	3.37	-----	20.84
6066	Atlantic Chemical Co., Norfolk, Va.	Atlantic Tobacco Grower	Benson	S	7.43	1.10	8.53	2.02	.58	2.60	3.00	3.00	5.70
5675	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh Special Tobacco Guano.	La Grange	R	7.15	1.42	8.57	1.22	1.46	2.68	2.70	2.70	19.52
5822	Craven Chemical Co., New Bern, N. C.	Planters Pride	Rocky Mount	R	7.73	1.19	8.92	1.10	1.10	2.20	2.92	-----	18.50
5678	Farmer's Cotton Oil Co., Wilson, N. C.	Marvel Great Crop Grower	La Grange	R	4.20	3.45	7.65	1.60	1.22	2.82	3.36	-----	19.88
6049	Farmer's Cotton Oil Co., Wilson, N. C.	Carolina Choice Tobacco Guano.	Benson	R	6.90	1.17	8.07	1.04	1.48	2.52	2.86	2.79	.072.10
5919	Farmer's Guano Co., Raleigh, N. C.	Big Crop Guano	Franklinton	R	7.03	1.30	8.33	1.12	1.36	2.48	3.48	-----	19.50
6067	do	do	Benson	D	7.45	1.84	9.29	.44	1.28	1.72	3.30	-----	17.66
5910	do	Togo Tobacco Guano	Youngsville	S	7.33	.69	8.02	1.14	1.24	2.38	3.13	3.13	5.50
5944	Miller Fertilizer Co., Baltimore, Md.	Harmony	Edenton	R	5.58	2.47	8.05	1.88	.70	2.58	2.93	-----	18.98
5823	Patapsco Guano Co., Baltimore, Md.	Patapsco Special Tobacco Mixture.	Rocky Mount	S	5.58	2.58	8.16	.96	1.60	2.56	3.00	3.00	7.35
6180	do	Unicorn Guano	Jonesboro	R	4.50	2.92	7.42	.88	1.90	2.78	3.12	-----	19.28
6072	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Guano for all crops	Norwood	S	5.53	2.14	7.67	1.46	1.14	2.60	3.21	-----	19.05
5828	do	Piedmont Guano for Tobacco	Spring Hope	R	6.75	1.32	8.07	1.08	1.24	2.32	3.56	3.56	7.00
5972	do	Privatt's Standard Guano	Edenton	R	4.48	1.87	6.35	1.90	1.10	2.00	4.46	-----	17.75
6105	Pocahontas Guano Co., Lynchburg, Va.	Spot Cash Tobacco Compound	Blanche	N	5.55	2.64	8.19	.60	1.82	2.50	3.17	3.17	9.50
6153	Powhatan Chemical Co., Richmond, Va.	King Brand Fertilizer	Wilson	R	6.65	2.42	9.07	.70	1.62	2.32	2.89	-----	18.90
5684	do	White Leaf Tobacco Fertilizer	New Bern	R	6.30	2.18	8.48	.10	2.46	2.56	3.29	3.29	3.90
5996	do	do	Henderson	R	7.43	1.57	9.00	1.28	1.50	2.78	3.11	3.11	.68
5855	Roberson, J. H. & Co., Robersonville, N. C.	Roberson's Bright Leaf Grower.	Pine Tops	R	7.60	1.11	8.71	1.56	1.52	3.08	3.69	3.69	8.00
5732	Union Guano Co., Winston, N. C.	Union Waterfowl Guano	Fremont	S	5.25	2.07	7.32	1.32	1.18	2.50	2.85	-----	17.97
5688	Va.-Car. Chemical Co., Richmond, Va.	Carolina Golden Belt Ammoniated Guano for Tobacco.	Goldsboro	R	4.90	1.74	6.64	1.58	1.52	3.10	3.14	3.14	3.70
5873	do	Cooper's Special Bright Tobacco Fertilizer.	Williamston	D	8.65	.52	9.17	.60	1.90	2.50	2.48	2.48	2.45
5671	do	Old Dominion Guano Co.'s Osceola Tobacco Guano.	Ayden	R	6.35	1.44	7.79	1.44	1.44	2.88	3.10	3.10	5.20
5708	do	Superlative Guano	Fremont	R	6.73	1.31	8.04	.98	1.52	2.50	3.11	-----	18.91
5718	do	Va. State Fertilizer Co.'s Buffalo Guano.	Whiteville	R	5.90	1.65	7.55	2.16	1.44	3.60	3.25	-----	22.21
5583	Winborne Guano Co., Tyler, N. C.	Farmer's Select Guano	Edenton	R	5.75	1.66	7.41	1.74	2.30	4.04	3.41	-----	23.75
Brands claiming													
6156	Miller Fertilizer Co., Baltimore, Md.	Potato and Vegetable Grower	Elizabeth City	S	4.78	3.01	8.00	1.26	1.14	2.00	4.00	-----	18.20
							7.79	-----	-----	2.40	3.87	-----	19.19

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Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts Per 100.										Relative Value per Ton at Factory.
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Potash.	Potash from Sulphate.	Chlorine.	
16131	Southern Exchange Co., Maxton, N. C.	Big Stick	Pembroke	D	7.48	1.09	8.57	1.62	1.38	3.00	4.00	---	---	\$ 22.01
5874	Brand claiming Wood, T. W. & Sons, Richmond, Va.	Standard Potato Fertilizer	Edenton	R	5.63	1.83	8.00	.66	1.68	2.00	5.00	---	---	19.30
6065	Brand claiming Navassa Guano Co., Wilmington, N. C.	Navassa Fruit Grower	Benson	R	7.13	1.44	8.00	1.22	.92	2.00	6.00	---	---	20.29
6157	Brand claiming Hubbard Fertilizer Co., Baltimore, Md.	Jersey Truckee	Elizabeth City	R	7.08	.99	8.00	1.02	1.14	2.00	10.00	---	---	20.40
6116	Brands claiming Home Fertilizer and Chemical Co., Baltimore, Md.	Yancey's Formula for Yellow Leaf Tobacco.	Winston	D	8.20	1.73	9.33	2.43	.90	3.00	2.00	---	---	20.99
5993	Navassa Guano Co., Wilmington, N. C.	Navassa C. S. M. Special	Barnesville	D	6.30	1.09	7.39	1.58	1.36	2.94	2.96	---	---	24.80
6128	Va.-Ga. Chemical Co., Richmond, Va.	Charlotte Oil and Fert. Co.'s Special 3 Per Cent Guano.	Roland	D	6.55	1.60	8.15	.80	1.86	2.66	2.86	---	---	25.76
5771	Brands claiming Acme Manufacturing Co., Wilmington, N. C.	Split Silk	Maxton	D	6.43	1.92	8.35	1.14	2.16	3.30	1.35	---	---	19.30
5705	Brands claiming Acme Manufacturing Co., Wilmington, N. C.	Acme Fertilizer	Wilmington	R	6.40	1.72	8.12	1.62	1.62	3.24	2.62	---	---	22.55
5737	Contentnea Guano Co., Wilson, N. C.	Acme Fertilizer for Tobacco	Fremont	R	6.85	1.73	8.58	1.60	1.50	3.10	2.85	---	---	19.61
6150	Virginia-Carolina Chemical Co., Richmond, Va.	Admiral	Mt. Olive	D	6.45	1.80	8.25	1.62	1.34	2.96	3.27	---	---	19.88
5593	Brands claiming Acme Manufacturing Co., Wilmington, N. C.	Atlas Guano	Washington	D	8.98	.87	8.00	.78	1.84	2.62	3.27	---	---	19.85
5931	Acme Manufacturing Co., Wilmington, N. C.	Pee Dee Special	Clinton	R	7.43	1.07	8.50	1.74	1.38	3.12	3.32	---	---	20.88
5766	American Agricultural Chemical Co., New York City	Lazaretto Special for Tobacco and Potatoes.	Edenton	R	5.68	2.40	8.08	1.58	1.58	3.16	3.01	---	---	21.08
6085	Brands claiming Zall's Bright Tobacco Grower	Creedmoor	Creedmoor	R	5.73	1.97	7.70	1.34	1.66	3.00	2.82	---	---	21.10
5598	American Fertilizer Co., Norfolk, Va.	American Eagle Guano	Edenton	R	6.83	1.81	8.64	2.16	1.28	3.44	3.31	---	---	20.40
												---	---	21.59
												---	---	21.61
												---	---	19.73
												---	---	22.77

6098	American Fertilizer Co., Norfolk, Va.	Miller & Co's Yellow Leaf Fertilizer.	Rudin	N	5.15	2.95	8.10	1.60	1.90	3.50	3.44	.93	2.51	.70	22.62
5655	Armour Fertilizer Works, Baltimore, Md.	Armour's Special Cotton Fertilizer.	Elizabeth City	R	6.15	2.01	8.16	2.20	1.04	3.24	3.37	-----	-----	-----	21.74
5682	do	Armour's Tobacco Special Fertilizer.	New Bern	R	6.95	2.15	9.10	1.26	1.70	2.96	2.69	.07	2.59	.05	20.91
5826	Atlantic Chemical Co., Norfolk, Va.	Atlantic H. G. Tobacco Guano.	Spring Hope	S	6.95	1.08	8.03	2.06	.96	3.02	3.01	3.01	-----	9.25	20.50
5849	Bailey, John L., Elm City, N. C.	Farmount Guano.	Elm City	S	7.73	1.60	9.33	1.68	1.48	3.16	2.80	-----	-----	-----	21.90
5564	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid Truck Guano.	Washington	D	7.25	1.62	8.87	.72	2.62	3.34	3.00	-----	-----	-----	22.30
5563	do	Baugh's, H. G. Tobacco Guano.	Washington	R	7.28	1.38	8.66	.54	2.74	3.28	3.06	3.06	-----	7.45	21.98
6168	Berkley Chemical Co., Norfolk, Va.	Advance Crop Grower	Shelly	R	5.40	2.45	7.85	1.50	1.70	3.26	2.93	-----	-----	-----	21.04
5809	Blackstone Guano Co., Blackstone, Va.	Berkley Tobacco Guano	Spring Hope	R	6.28	1.74	8.02	1.90	1.22	3.12	3.06	3.06	-----	6.55	20.88
6123	Bragaw, Wm., & Co., Washington, N. C.	Jim Crow for Tobacco	Roxboro	D	5.63	3.69	9.32	2.38	.52	2.92	2.89	2.89	-----	7.2	21.20
5608	Burton, C. J., Guano Co., Baltimore, Md.	Beaufort County Guano	Washington	R	6.45	1.64	8.09	2.02	1.12	3.14	3.21	-----	-----	-----	21.17
5795	do	Burton's Best	Wilson	R	5.50	2.59	8.09	1.78	1.30	3.08	3.12	-----	-----	-----	20.87
5741	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Tobacco Queen	Fremont	R	5.78	2.54	8.32	1.90	1.20	3.10	3.09	3.09	-----	6.65	21.11
5778	do	Horne's Best	Maxton	R	8.13	1.11	9.24	1.30	1.60	2.90	3.21	-----	-----	-----	21.41
5951	Clayton Oil Mill, Clayton, N. C.	Clayton Guano	Selma	D	6.50	2.34	8.84	.88	1.92	2.80	3.12	-----	-----	-----	20.62
5685	Columbia Guano Co., Norfolk, Va.	Hycro Tobacco Guano	New Bern	R	6.60	1.67	8.27	.78	2.25	3.04	3.07	3.07	-----	9.07	20.85
5923	do	Our Best Meal Guano	Lumberton	R	5.43	2.34	7.77	.18	2.82	3.00	3.30	-----	-----	-----	20.52
6148	Contentnea Guano Co., Wilson, N. C.	Pick Leaf Tobacco	Lucama	R	7.20	1.91	9.11	.78	2.14	2.92	3.44	3.44	-----	5.00	21.61
5925	Grow Fertilizer Co., Monroe, N. C.	Grow's High Grade Blood and Fish Guano	Monroe	R	5.48	1.21	6.69	.78	3.26	4.04	3.40	-----	-----	-----	23.09
5927	do	do	Monroe	R	7.13	1.44	8.57	.06	2.24	2.30	2.77	-----	-----	-----	18.38
6129	Etiwan Fertilizer Co., Charleston, S. C.	Etiwan Cotton Compound	Roland	N	6.43	1.60	8.03	1.86	.64	2.50	3.15	-----	-----	-----	18.94
5633	Farmer's Cotton Oil Co., Wilson, N. C.	Golden Gem Guano	Fremont	D	6.85	1.12	7.97	1.50	1.90	3.40	3.16	-----	-----	-----	21.86
5992	Farmer's Guano Co., Raleigh, N. C.	Golden Grade Guano	Barnesville	N	7.75	1.47	9.22	1.42	1.14	2.56	3.05	-----	-----	-----	20.10
6091	Hampton Guano Co., Norfolk, Va.	Hampton Tobacco Guano	Reidsville	R	5.65	2.34	7.99	2.08	1.92	3.00	2.98	2.98	-----	6.50	20.37
6151	do	Princess Prolific Producer	Lucama	R	5.73	2.15	7.88	.92	1.84	2.76	2.91	-----	-----	-----	19.40
5793	Imperial Company, Norfolk, Va.	Imperial Bright Tobacco Guano	Wilson	R	7.10	.91	8.01	1.84	1.22	3.06	3.41	3.41	-----	5.55	21.05
5755	do	Imperial Tobacco Guano	Washington	R	6.53	1.44	7.97	1.86	1.40	3.26	3.24	3.24	-----	6.75	21.49
5621	do	Imperial X L O Cotton Guano	Washington	R	6.60	1.50	8.10	1.78	1.35	3.14	3.38	-----	-----	-----	21.37
5689	Martin, D. B., Co., Philadelphia, Pa.	Martin's Bull Head Fertilizer	Goldsboro	S	1.96	5.05	7.01	2.34	.76	3.10	4.77	-----	-----	-----	21.78

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5591	Richmond Guano Co., Richmond, Va.	Gilt Edge Fertilizer	Edenton	S	4.33	3.53	7.86	1.76	1.06	2.82	3.58	20.31
5765	Royster, F. S., Guano Co., Norfolk, Va.	Marlboro High Grade Cotton Grower.	Edenton	S	6.98	1.26	8.24	2.02	1.00	3.02	2.94	20.61
5686	Royster, F. S., Guano Co., Norfolk, Va.	Bonanza Tobacco Guano	New Bern	R	6.28	1.78	8.06	1.56	1.50	3.06	3.14	20.80
5779	Southern Exchange Co., Maxton, N. C.	Correct Cotton Compound	Maxton	R	6.93	1.72	8.65	1.08	2.02	3.10	4.14	22.56
5775	do	Jack's Best Fertilizer	Maxton	R	5.45	2.84	8.29	.80	2.34	3.14	3.16	21.30
5810	Southern Cotton Oil Co., Rocky Mount, N. C.	Egerton's Old Reliable	Spring Hope	R	6.35	2.23	8.63	.74	1.48	2.22	3.30	19.72
6185	Swift Fertilizer Works, Atlanta, Ga.	Swift's Rivalist High Grade Guano	Rockingham	S	6.80	1.36	8.16	.92	2.08	3.00	3.16	20.72
6112	Tuscarora Fertilizer Co., Buena Vista, Va.	Tuscarora	Woodsdale	R	3.45	4.39	7.84	1.04	2.14	3.13	3.31	21.19
5991	Union Guano Co., Winston, N. C.	Union Homestead Guano	Barnesville	R	5.03	1.90	6.93	.82	2.08	2.90	4.56	20.82
5946	Upshur, R. L., Norfolk, Va.	Upshur's Cotton Guano	Elizabeth City	S	6.55	1.43	7.98	1.32	1.70	3.02	3.27	20.74
5710	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's A. A. Medial Brand.	Fremont	R	6.85	1.47	8.32	1.38	1.50	2.88	3.38	20.71
5616	do	Davie & Whittle's Owl Brand Guano for Tobacco.	Greenville	R	7.25	1.49	8.74	2.32	1.26	3.58	3.39	23.41
6130	do	Durham Fert. Co.'s Farmer's Friend H. G. Fertilizer.	Roland	N	6.30	1.76	8.06	1.62	1.38	3.00	2.96	20.41
5586	do	Durham Fertilizer Co.'s Gold Medal Brand.	Edenton	D	7.20	1.14	8.34	1.52	1.72	3.24	3.17	21.68
5791	do	Norfolk and Car. Chem. Co.'s Amazon H. G. Manure.	Wilson	S	6.58	1.79	8.37	3.12	.98	3.10	2.64	20.66
5643	do	Norfolk and Car. Chem. Co.'s Bright Leaf Tobacco Grower.	Washington	R	6.33	1.70	8.03	3.00	1.50	4.50	3.02	25.40
5645	do	Old Dominion Farmer's Friend High Grade Fertilizer.	Washington	R	6.38	1.58	7.96	1.58	1.62	3.20	3.09	21.12
5578	do	Old Dominion Farmer's Friend Special Tobacco Fertilizer.	Washington	R	7.63	.73	8.36	1.54	1.80	3.34	2.51	21.31
5646	do	Powers, Gibbs & Co.'s Old Kentucky High Grade Tobacco Manure.	Washington	R	6.35	1.50	7.85	1.62	1.80	2.42	3.10	21.76
5594	do	Special High Grade Tobacco Fertilizer.	Washington	D	7.78	.59	8.37	.52	2.58	3.10	3.19	21.27
5797	do	Va. Slate Fertilizer Co.'s Dunington's Special Formula.	Wilson	R	6.05	1.63	7.68	2.14	1.02	3.26	2.89	20.85
5582	Winborne Guano Co., Tynner, N. C.	Winborne's Tobacco Guano	Edenton	R	7.03	1.39	8.42	1.30	2.50	3.80	2.95	23.36
5921	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s Solid Gold Tobacco Guano.	Henderson	R	6.13	2.19	8.32	.20	2.80	3.00	2.92	20.67
5748	Brand claiming Hadley, Harris & Co., Wilson, N. C.	Golden Weed Tobacco Grower	Wilson	R	7.60	1.24	8.84	1.30	1.30	3.00	3.50	20.95

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5666	do do	Pelican	Chadbourne	R	6.85	1.40	8.25	3.20	.92	4.12	4.04	25.46
5679	Craven Chemical Co., New Bern, N. C.	Hanover Standard Guano	LaGrange	R	7.45	1.22	8.67	2.50	1.42	3.92	3.94	25.09
5736	Miller Fertilizer Co., Baltimore, Md.	Miller's Irish Potato	Fremont	D	5.43	2.57	8.00	1.98	2.46	3.94	4.33	24.96
5780	North Carolina Cotton Oil Co., Wilmington, N. C.	Wilmington Truck Grower	Maxton	R	7.00	1.37	8.37	2.18	2.00	4.18	4.76	26.56
5726	Powhatan Chemical Co., Richmond, Va.	North State Special	Fremont	S	6.00	2.43	8.43	3.18	.84	4.02	4.44	25.73
5875	Royster, F. S., Guano Co., Norfolk, Va.	Truckers' Delight	Elizabeth City	R	7.38	1.17	8.55	2.42	1.02	3.44	3.69	23.10
5900	Swift Fertilizer Works, Atlanta, Ga.	Swifts' Monarch Vegetable Grower	Clinton	R	5.60	2.47	8.07	1.58	1.82	3.40	4.94	23.91
5864	Union Guano Co., Winston, N. C.	Union Premium Guano	Teachey	S	6.15	2.11	8.26	1.96	1.70	3.96	4.35	24.29
5880	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Special	Goldsboro	R	6.78	1.51	8.29	2.84	1.20	4.04	3.30	24.42
5894	Brand claiming Farmer's Cotton Oil Co., Wilson, N. C.	Regal Tobacco Guano	Everett	R	6.33	1.77	8.10	1.56	2.00	3.50	5.00	24.25
5601	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Powers, Gibbs & Co.'s Truck Farmers Special Ammoniated Guano	Elizabeth City	R	7.48	1.46	8.94	2.68	1.82	4.00	5.00	25.90
5665	Brands claiming Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Laboss Guano	Dover	R	5.08	2.71	7.99	3.48	1.66	5.00	5.84	29.20
5604	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Virginia Fertilizer Co.'s Virginia Truck	Elizabeth City	R	6.38	1.92	8.30	3.12	2.30	5.42	5.16	31.03
5877	do do	Norfolk Truck and Tomato Grower	do	R	7.55	1.04	8.59	2.72	2.24	4.96	4.68	29.25
5701	Brand claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Special Guano	Wilmington	R	7.08	1.79	8.87	2.62	1.60	4.00	6.00	27.00
5749	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Best Guano	Wilson	R	7.83	.86	8.69	1.14	3.28	4.22	6.19	28.71
5676	Brand claiming Pocomoke Guano Co., Norfolk, Va.	Cinco Tobacco Guano	LaGrange	R	5.85	2.21	8.06	.74	1.88	4.50	7.00	29.76
5844	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Tobacco Fertilizer	Wilson	S	7.60	1.87	8.50	.97	.72	2.50	1.52	18.44
5872	Brands claiming American Agricultural Chemical Co., New York.	American Agricultural Chemical Gold Dust Guano	Williamston	R	5.90	2.33	9.00	.64	1.48	2.00	2.00	16.90
6103	Benton, J. A., Ruffin, N. C.	Benton's N. C. Bright Fertilizer	Ruffin	R	8.00	1.88	9.88	1.14	1.36	2.50	1.47	18.76
5659	Ober, G. & Sons Co., Baltimore, Md.	Ober's Special Ammoniated Dissolved Bone	Edenton	R	8.25	1.00	9.25	1.14	.98	2.12	2.41	17.97

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5968	Brands claiming American Agricultural Chemical Co., New York.	Lazaretto Retriever	Washington	R	6.55	2.40	9.00	1.05	1.24	2.25	4.00	19.92
5729	do	Zell's Victoria Animal Bone Compound.	Fremont	R	6.20	2.82	9.02	1.22	1.28	2.50	4.15	19.78
6096	Pocahontas Guano Co., Lynch- burg, Va.	High Grade 4 Per Cent Tobacco Compound, Mohawk Brand.	Pelham	D	8.48	1.36	9.84	.85	1.46	2.32	4.12	21.04
6104	Pocomoke Guano Co., Norfolk, Va.	Monticello Animal Bone Fertilizer.	Blanche	D	8.08	1.46	9.54	1.10	1.28	2.38	4.00	20.84
6179	Brand claiming Swift Fertilizer Works, Atlanta, Ga.	Swift's Farmer's Favorite H. G. Guano.	Sanford	D	7.38	1.94	9.00	.98	1.06	2.00	3.00	18.00
6155	Brand claiming Va.-Car. Chemical Co., Rich- mond, Va.	Charlotte Oil and Fertilizer Co's High Grade Special Tobacco Fertilizer.	Nashville	D	8.38	2.62	9.00	.32	1.64	1.96	2.76	18.20
5912	Brand claiming Va.-Car. Chemical Co., Rich- mond, Va.	Southern Chemical Co's Sun Brand Guano.	Smithfield	D	7.70	1.70	9.00	.56	1.54	2.50	5.00	21.85
6137	Brand claiming Va.-Car. Chemical Co., Rich- mond, Va.	Powers, Gibbs & Co's Cotton- seed Meal Standard Guano.	Lincolnton	S	6.93	2.50	9.43	1.28	1.72	3.00	2.80	20.20
5906	Brand claiming Richmond Guano Co., Rich- mond, Va.	Hunter & Dunn's Special Ammoniated Fertilizer.	Millbrook	R	6.70	2.54	9.00	.10	3.12	3.00	2.25	20.47
5932	Brands claiming N. C. Cotton Oil Co., Henderson, N. C.	Franklin Tobacco Grower	Louisburg	D	7.68	1.69	9.00	1.24	1.46	2.70	3.72	21.30
5920	do	Unecedit Tobacco Fertilizer	Henderson	D	8.08	1.62	9.70	1.24	1.24	2.48	3.27	21.43
5936	Ober, G. & Sons Co., Balli- more, Md.	Ober's Special High Grade Fer- tilizer.	Red Springs	R	7.98	1.08	9.06	1.80	1.00	2.80	3.28	20.51
5658	Palapasco Guano Co., Baltimore, Md.	Palapasco Tobacco Fertilizer	Edenton	R	7.08	2.11	9.19	1.84	1.36	3.20	3.39	21.00
5995	Pocahontas Guano Co., Lynch- burg, Va.	Pocahontas Special Tobacco Fertilizer.	Henderson	R	7.85	1.56	9.41	1.32	1.44	2.76	3.04	22.55
6130	Brand claiming Va.-Car. Chemical Co., Rich- mond, Va.	Great Texas Cotton Grower Guano.	Lincolnton	D	7.40	1.65	9.00	2.26	1.34	3.00	4.00	20.92
6095	Brand claiming Reidsville Fertilizer Co., Reids- ville, N. C.	Lion Brand	Reidsville	D	4.38	3.45	9.00	.66	2.34	3.00	6.00	22.40
5315	Brands claiming Richmond Guano Co., Richmond, Va.	Saunders' Special Formula for Bright Tobacco.	Spring Hope	R	5.45	3.38	9.00	.82	2.52	3.60	5.00	27.22
5599	Brand claiming American Fertilizer Co., Nor- folk, Va.	Strawberry Guano	Edenton	S	7.65	1.39	9.00	.72	1.44	3.50	9.00	24.60
										4.16	7.93	24.24
												25.15
												24.50
												29.55
												30.58

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5559	Brand claiming Acme Mfg. Co., Wilmington, N. C.	Acme Truck Grower	Mt. Olive	R	4.93	.98	6.00	5.91	2.78	1.38	4.00	8.00	27.40
												7.88	27.71
5571	Brands claiming Baugh & Sons Co., Norfolk, Va.	Baugh's 5-6-5 Guano	Elizabeth City	D	4.90	1.77	6.00	6.67	3.36	1.90	5.00	5.00	27.40
5567	Hubbard Fertilizer Co., Balti- more, Md.	Hubbard's 5 Per Cent Truck Guano.	Washington	R	4.25	1.59	5.84	5.84	3.82	1.24	5.06	5.16	27.93
5563	Imperial Company, Norfolk, Va.	Williams Special Potato Guano	Elizabeth City	R	5.23	1.17	6.40	6.40	2.24	2.48	4.72	7.91	30.03
5568	Brands claiming American Fertilizer Co., Nor- folk, Va.	Special Potato Manure	Elizabeth City	D	6.08	.99	6.00	7.07	2.98	2.52	5.00	7.00	29.60
											5.50	5.36	30.41
5569	Baugh & Sons Co., Norfolk, Va.	Baugh's Peru-Guano, Substi- tute for Potatoes and all Vegetables.	Elizabeth City	R	5.18	1.36	6.54	6.54	2.84	1.92	4.76	7.46	29.80
5562	Imperial Company, Norfolk, Va.	Imperial Potato Guano	Elizabeth City	R	5.45	1.56	7.01	7.01	3.12	1.96	5.08	8.78	32.73
5762	Muller Fertilizer Co., Baltimore, Md.	High Grade Potato	Elizabeth City	R	3.73	2.36	6.07	6.07	3.04	2.54	5.58	6.86	31.44
5576	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Early Vegetable Manure	Edenton	R	5.08	1.14	6.22	6.22	2.43	2.08	4.51	6.33	27.44
5600	Va.-Car. Chemical Co., Rich- mond, Va.	Va.-Car. Invincible High Grade Fertilizer for Truck.	Elizabeth City	D	4.98	2.01	6.99	6.99	2.44	2.90	5.34	7.53	32.19
5835	Brand claiming Va.-Car. Chemical Co., Rich- mond, Va.	Tinsley's Special Irish Potato Guano.	Edenton	R	3.48	1.84	6.00	5.32	2.90	4.52	7.42	6.05	32.90
													35.93
5609	Brands claiming American Agricultural Chem- ical Co., New York, N. Y.	Lazaretto Farmers' Favorite for Producing Quick Growth	Washington	R	5.40	1.74	6.00	7.14	4.64	2.22	6.86	5.12	34.00
5572	Baugh & Sons Co., Norfolk, Va.	Baugh's Cabbage Guano	Elizabeth City	R	5.15	1.55	6.70	6.70	4.46	2.74	7.20	5.22	35.53
5803	do	Baugh's 7 Per Cent Potato Guano.	Winston	R	4.90	1.41	6.31	6.31	4.34	2.60	6.94	5.52	34.65
5624	Hubbard Fertilizer Co., Balti- more, Md.	Hubbard's Truckers 7 Per Cent Royal Seal Compound.	Washington	R	3.93	1.94	5.87	5.87	5.56	1.24	6.80	5.18	31.42
5945	Martin, D. B., Company, Phila- delphia, Pa.	Martin's 7 Per Cent Guano	Edenton	R	3.58	2.53	6.11	6.11	5.88	.42	6.30	5.51	32.34
5596	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Special Truck Ferti- lizer.	Edenton	R	4.78	1.34	6.12	6.12	4.56	2.06	6.62	5.02	32.87
5577	Virginia-Carolina Chemical Co., Richmond, Va.	Old Dominion 6-7-5 Truck Guano.	Washington	R	4.80	1.16	5.96	5.96	2.96	3.86	6.82	4.74	34.06
5703	Brand claiming Griffith & Boyd, Baltimore, Md.	Griffith & Boyd's Spring Crop Grower.	Wilmington	R	4.18	2.44	6.50	6.50	.64	1.56	4.50	2.00	22.90
											2.20	4.33	17.98
5834	Brand claiming Imperial Company, Norfolk, Va.	Roanoke Crop Grower	Edenton	R	6.40	.99	7.00	7.39	.86	2.04	3.00	2.00	18.40
5792	Brands claiming Virginia-Carolina Chemical Co., Richmond, Va.	Virginia-Carolina Chemical Co.'s Formula 44.	Wilson	S	5.55	2.72	7.00	8.27	2.44	.76	2.90	2.33	18.78
											3.20	3.20	20.05
6106	do	do	Somora	N	5.50	2.82	8.32	8.32	2.20	1.02	3.22	2.63	21.06
													21.00

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6025	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Great Potato Guano.	Beaufort	R	3.90	3.30	7.20	2.46	1.88	4.34	7.49	29.04
5876	Royster, F. S., Guano Co., Nor- folk, Va.	Royster's Early Truck Guano.	Elizabeth City	S	6.78	.77	7.55	3.38	1.00	4.38	7.56	29.58
5592	Brand claiming Richmond Guano Co., Richmond, Va.	Special High Grade for Truck	Edenton	S	4.45	2.44	7.00			6.00	5.00	31.60
							6.89	4.44	1.06	5.50	5.46	31.17
5754	Brands claiming Columbia Guano Co., Norfolk, Va.	Columbia 7 Per Cent Truck Guano.	Ahoskie	R	7.38	.94	7.00			7.00	7.00	37.10
							8.02	5.94	.88	6.82	6.16	36.50
6062	Roberson, J. H., & Co., Rob- ersonville, N. C.	Roberson Special Potato Guano	Robersonville	R	5.85	.73	6.58	3.90	2.30	6.20	5.59	32.52
6115	Royster, F. S., Guano Co., Nor- folk, Va.	Royster's Special 7 Per Cent Truck Guano.	Winton	R	6.68	1.11	7.79	5.32	.86	6.18	6.56	34.62
5893	Va.-Car. Chemical Co., Norfolk, Va.	Atlantic and Virginia Fertil- izer Co.'s Carolina Trucker.	Robersonville	R	6.30	1.35	7.65	6.06	.62	6.68	6.89	36.51
6174	Brands claiming Richmond Guano Co., Richmond, Va.	Premium Grain and Grass Grower.	Mocksville	D	4.90	3.59	8.00				2.00	9.40
							8.49				2.01	9.85
6019	Royster, F. S., Guano Co., Nor- folk, Va.	Royster's Bone and Potash	High Point	R	6.38	1.76	8.14				1.83	9.34
6041	Brands claiming Union Guano Co., Winston, N. C.	Surprise Soluble Bone and Pot- ash.	Burlington	R	5.75	2.84	8.00				2.25	9.67
							8.59				2.98	11.01
6042	Va.-Car. Chemical Co., Rich- mond, Va.	Allison & Addison's McGavock Special Potash Mixture.	Burlington	R	4.00	4.11	8.11				1.89	9.38
5981	Brands claiming Va.-Car. Chemical Co., Rich- mond, Va.	Old Dominion Guano Co.'s Dis- solved Bone and Potash.	Benson	N	7.10	4.57	8.50				2.00	9.85
							11.67				1.36	12.00
6020	Brands claiming Swift Fertilizer Works, Atlanta, Ga.	Swift's Plantation Standard Grade Phosphate and Potash.	High Point	R	4.03	4.12	8.15				1.72	9.16
6176	Va.-Car. Chemical Co., Rich- mond, Va.	Durham Fertilizer Co.'s Carr's Special Wheat Grower.	Winston	D	5.03	3.07	8.10				3.58	11.22
6058	Va.-Car. Chemical Co., Rich- mond, Va.	Old Dominion Guano Co.'s Mil- ler's Special Wheat Mixture.	Gold Hill	R	3.05	5.64	8.69					11.78
6052	Brands claiming Union Guano Co., Winston, N. C.	Liberty Bell Crop Grower	Benson	D	4.90	3.00	7.90				3.20	10.63
							10.00				1.50	10.65
6040	Brands claiming American Fertilizer Co., Nor- folk, Va.	Dissolved Bone for Corn and Wheat.	Burlington	R	6.43	3.67	10.10				1.17	10.37
5623	Brands claiming American Fertilizer Co., Nor- folk, Va.	Armour's Phosphate and Potash.	Elizabeth City	R	5.50	4.89	10.39				1.96	11.50
6074	Armour Fertilizer Works, Wil- mington, N. C.	Enoree Acid Phosphate and Potash.	Rockwell	R	8.48	1.59	10.07				1.78	11.02
6173	Ashepool Fertilizer Co., Charle- ton, S. C.	Enoree Acid Phosphate and Potash.	Mooresville	R	7.95	3.83	11.78				2.11	12.92
6142	Atlantic Chemical Co., Norfolk, Va.	Atlantic Bone and Potash for Grain.	Mt. Gilead	R	8.55	2.05	10.60				2.64	12.44

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows; N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1907—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Percentage Composition or Parts Per 100.										Relative Value per Ton at Factory.	
			Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
MIXED FERTILIZERS.														
6146	Atlantic Chemical Co., Norfolk, Va.	Edenton	R	5.10	4.45	9.55				2.18				\$ 10.99
5948	Baugh & Sons Co., Norfolk, Va.—Baugh's Soluble Alkaline Superphosphate.	Elizabeth City	R	2.95	6.55	9.50				2.39				11.17
6171	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Hickory	D	11.90	2.05	13.95				2.47				15.27
5977	Columbia Guano Co., Norfolk, Va.	Robersonville	R	8.50	2.09	10.59				1.69				11.38
6134	Farmer's Cotton Oil Co. Wilson, N. C.	Fremont	D	7.03	2.90	9.93				2.06				11.20
5794	Hubbard Fertilizer Co., Baltimore, Md.	Washington	D	5.20	4.82	10.02				2.07				11.29
5806	Imperial Company, Norfolk, Va.	Windsor	D	8.03	1.02	9.05				3.09				11.54
5903	Navassa Guano Co., Wilmington, N. C.	Clinton	D	6.55	1.99	8.54				2.98				10.96
6126	Pocahontas Guano Co., Lynchburg, Va.	Helena	N	7.50	2.41	9.91				2.27				11.41
6076	Pocomoke Guano Co., Norfolk, Va.	Troy	D	7.83	2.28	10.11				2.15				11.46
5979	Powhatan Chemical Co., Richmond, Va.	Smithfield	R	7.50	2.74	10.24				1.78				11.17
5786	Royster, F. S., Guano Co., Norfolk, Va.	Warsaw	R	8.58	1.59	10.17				2.37				11.75
6175	Swift Fertilizer Works, Atlanta, Ga.	Winston	R	5.80	4.02	9.82				2.00				11.03
6021	Union Guano Co., Winston, N. C.	High Point	D	7.25	2.40	9.65				2.03				10.92
5860	Upshur, R. L., Norfolk, Va.	Moyock	R	8.45	2.19	10.64				1.95				11.72
6018	Va.-Car. Chemical Co., Richmond, Va.	Lexington	R	5.83	4.82	10.35				1.37				10.82
6006	do do	Salisbury	D	6.43	3.82	10.25				1.91				11.32
6075	do do	Norwood	R	5.63	5.10	10.73				1.70				11.52

6050	---do---	Durham Fertilizer Co.'s Bone and Potash Mixture.	Benson	D	5.15	4.57	9.72	1.55	10.45
6172	---do---	High Grade Alkaline Bone and Potash.	Taylorsville	R	7.38	3.48	10.86	2.35	12.36
6178	---do---	Powers, Gibbs & Co.'s Dissolved Bone and Potash.	Warsaw	R	8.58	1.56	10.14	2.46	11.83
6166	---do---	Southern Chemical Co.'s Winston Bone and Potash Compound.	Winston	D	6.93	2.42	9.35	2.32	10.97
5904	---do---	Tinsley & Co.'s Bone and Potash Mixture.	Clinton	R	8.43	1.61	10.04	2.07	11.31
6165	---do---	Travers Capital Bone-Potash Compound.	Winston	R	7.80	2.42	10.22	1.93	11.32
5837	White, M. H., & Co., Hertford, N. C.	White & Co.'s Special Corn Mixture.	Hertford	R	8.55	1.69	10.24	2.08	11.50
6059	Brands claiming	Armour's Superphosphate and Potash.	Rockwell	D	8.63	1.29	9.92	4.00	13.40
5838	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Potash Mixture.	Edenton	R	6.03	3.21	9.24	3.87	13.18
5980	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Special Bone and Potash Mixture.	Benson	D	8.08	2.59	10.67	4.41	13.16
5613	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Special Mixture Bone and Potash.	Washington	R	2.55	7.65	10.20	3.23	13.15
6077	Imperial Co., Norfolk, Va.	Catawba Wheat Grower	Mt. Gilead	R	9.03	1.29	10.32	3.33	12.95
6005	Piedmont-Mt. Airy Guano Co., Richmond, Va.	Levering's Potashed Bone	Salisbury	D	7.80	1.65	9.45	4.80	13.78
6088	Union Guano Co., Winston, N. C.	Quaker Grain Mixture	Greensboro	R	5.63	4.45	10.08	3.43	12.84
6118	Virginia-Carolina Chemical Co., Richmond, Va.	Co.'s Special Potash Mixture	Garysburg	N	5.08	4.42	9.50	3.33	12.76
5768	Brands claiming	Phosphoric Acid and Potash	Elizabeth City	R	8.35	2.29	10.64	5.00	14.50
5881	more, Md.	Hampton Bone and Potash Mixture.	Edenton	R	8.43	2.66	11.09	5.25	15.35
5839	Pocomoke Guano Co., Norfolk, Va.	Alkali Bone	Edenton	R	8.60	2.60	11.20	2.10	12.29
6132	Brands claiming	Horne & Sons High Grade Bone and Phosphate.	Camron	D	12.05	2.09	14.14	2.00	12.28
6051	Patapsco Guano Co., Baltimore, Md.	Patapsco High Grade Bone and Potash.	Benson	D	8.45	2.64	11.09	5.00	15.40
6145	Brands claiming	Crown Peanut Grower	Edenton	R	5.75	1.25	7.00	2.51	15.48
6117	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Peanut Special	Ahokie	R	4.58	2.92	7.50	4.87	15.33

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows; N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

5888	Columbia Guano Co., Norfolk, Va.	Columbia H. G. Dissolved Bone-	Littleton	R	10.25	3.41	13.66	10.92
6023	Farmers Guano Co., Raleigh, N. C.	Farmer's High Grade Acid Phosphate.	Lexington	D	9.90	2.70	12.60	10.08
5897	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Dissolved Bone.	Goldshoro	D	10.35	2.50	12.85	10.28
5752	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade Dissolved Bone.	Wilson	D	9.65	4.55	13.20	10.56
6079	Southern Cotton Oil Co., Charlotte, N. C.	Silver King High Grade Dissolved Bone.	Richfield	D	9.13	3.56	12.69	10.15
6046	Swift Fertilizer Works, Atlanta, Ga.	Swift's Harrow High Grade Acid Phosphate.	Greensboro	D	6.40	4.65	11.05	8.84
6008	Union Guano Co., Winston, N. C.	Union Dissolved Bone	High Point	D	10.00	3.84	13.84	11.07
6045	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's I X L Acid Phosphate.	Gibsonville	D	8.30	4.47	12.77	10.21
5431	do	Durham Fertilizer Co.'s Double Bone Phosphate—Ex. Strong.	Statesville	RP	9.15	4.74	13.89	11.11
5888	do	do	Concord	R	9.63	4.36	13.99	11.19
5723	do	Travers & Co.'s Standard Dissolved S. C. Bone.	Whiteville	N	10.53	2.57	13.10	10.48
Brands claiming								
5899	Acme Mfg. Co., Wilmington, N. C.	High Grade Acid Phosphate	Maxton	R	11.98	2.07	14.05	11.24
5638	American Fertilizer Co., Norfolk, Va.	do	Elizabeth City.	D	12.50	1.91	14.41	11.53
6024	do	Lazaretto Acid Phosphate	Lexington	N	10.10	3.64	13.74	10.99
5840	Armour Fertilizer Works, Baltimore, Md.	Armour's Star Phosphate Fertilizer.	Hertford	R	11.65	2.70	14.35	11.48
5636	Arps, G. L., & Co., Norfolk, Va.	14 Per Cent Acid Phosphate.	Edenton	R	6.15	7.25	13.40	10.72
5843	Atlantic Chemical Co., Norfolk, Va.	Atlantic 14 Per Cent Acid Phosphate.	Edenton	R	11.53	2.21	13.74	10.99
5706	Baugh & Sons Co., Norfolk, Va.	High Grade Acid Phosphate.	Wilmington	D	8.98	5.41	14.39	11.51
5865	Burton, C. J., Guano Co., Baltimore, Md.	Acid Phosphate	Louisburg	R	11.28	3.37	14.65	11.72
5819	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Climax Dissolved Bone	Spring Hope	R	11.30	2.02	13.32	10.65
5758	Columbia Guano Co., Norfolk, Va.	Columbia 14 Per Cent Acid Phosphate.	Ahoskie	R	11.08	3.04	14.12	11.29
5841	Hampton Guano Co., Norfolk, Va.	Hampton Acid Phosphate	Edenton	R	11.63	2.81	14.44	11.55
5589	Harrell, S. B., & Co., Norfolk, Va.	Harrell's Acid Phosphate	Edenton	D	11.90	3.02	14.92	11.93
5614	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's High Grade Tennessee Phosphate.	Washington	R	10.30	3.49	13.79	11.03
5661	Imperial Co., Norfolk, Va.	Imperial High Grade Acid Phosphate.	Elizabeth City.	R	12.23	1.90	14.13	11.30

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ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1907—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts Per 100.										Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
RAW OR UNMIXED FERTILIZERS.															
5883	Martin, D. B., Company, Philadelphia, Pa.	Martin's 14 Per Cent Acid Phosphate.	Edenton	R	9.80	3.99	13.79								\$ 11.03
5964	Miller Fertilizer Co., Baltimore, Md.	Miller Acid Phosphate	Louisburg	R	8.40	5.76	14.16								11.32
5869	Navassa Guano Co., Wilmington, N. C.	Navassa 14 Per Cent Acid Phosphate.	Teachey	R	11.25	2.27	13.52								10.81
5949	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	14 Per Cent Acid Phosphate	Pantego	R	11.93	2.67	14.60								11.68
5857	Norfolk Fertilizer Co., Norfolk, Va.	High Grade Acid Phosphate	Sharpsburg	R	11.23	2.99	14.22								11.37
5931	Ober, G., & Sons Co., Baltimore, Md.	Ober's Dissolved Bone Phosphate.	Louisburg	R	13.80	1.88	15.68								12.54
5842	Patapasco Guano Co., Baltimore, Md.	Patapasco Pure Dissolved S. C. Phosphate.	Edenton	R	11.95	2.70	14.65								11.72
5802	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont High Grade S. C. Bone.	Edenton	D	12.05	2.07	14.12								11.29
5936	Poahontas Guano Co., Lynchburg, Va.	Imperial Dissolved S. C. Phosphate.	Kittrell	D	8.50	5.36	13.86								11.08
5851	Pocomoke Guano Co., Norfolk, Va.	Peerless Acid Phosphate	Washington	R	10.40	3.74	14.14								11.31
5983	Powhatan Chemical Co., Richmond, Va.	High Grade Acid Phosphate	Smithfield	D	10.50	3.72	14.22								11.37
6056	Rasin-Monumental Co., Baltimore, Md.	Rasin's Acid Phosphate	Edenton	N	10.58	4.08	14.66								11.72
5807	Richmond Guano Co., Richmond, Va.	High Grade Acid Phosphate	Tunis	D	11.05	2.75	13.80								11.04
5835	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate.	Edenton	R	11.60	2.48	14.08								11.26
6089	Union Guano Co., Winston, N. C.	Union High Grade Acid Phosphate.	Winston	N	9.18	4.32	13.50								10.80
6147	Upshur, R. L., Norfolk, Va.	Upshur's High Grade Acid Phosphate.	Edenton	R	13.63	1.77	15.40								12.32
5939	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Fulton Acid Phosphate.	Concord	R	10.38	3.79	14.17								11.33

5637	---do---	14 Per Cent Acid Phosphate	Edenton	N	12.88	2.17	15.05	---	---	12.04
5638	---do---	Durham Fertilizer Co.'s Excel-	Goldsboro	R	10.63	2.97	13.60	---	---	10.88
	---	sior Dissolved Bone Phos-	---	---	---	---	---	---	---	---
	---	phate.	---	---	---	---	---	---	---	---
5787	---do---	---do---	Warsaw	R	12.08	1.66	13.74	---	---	10.99
6080	---do---	Lynchburg Guano Co.'s Solu-	Troy	N	10.38	3.04	13.42	---	---	10.73
	---	ble Bone Phosphate.	Wallace	---	---	---	---	---	---	---
5868	---do---	Tinsley's Powhatan Acid Phos-	---	R	11.28	2.86	14.14	---	---	11.31
	---	phate.	---	---	---	---	---	---	---	---
6133	---do---	Valley of Virginia Phosphate	Rowland	D	10.43	2.89	13.32	---	---	10.65
5888	---do---	High Grade Acid Phosphate	Edenton	R	11.56	2.87	14.37	---	---	11.49
	---	---	---	---	---	---	---	---	---	---
	---	Acid Phosphate	Spring Hope	D	11.58	4.80	16.38	---	---	12.80
5830	Brands claiming	---	---	---	---	---	---	---	---	13.10
	Acme Mfg. Co., Wilmington,	---	---	---	---	---	---	---	---	---
	N. C.	---	---	---	---	---	---	---	---	---
5994	Armour Fertilizer Works, Wil-	Armour's 16 Per Cent Acid	Lumberton	D	15.48	1.48	16.96	---	---	13.56
	mington, N. C.	Phosphate.	---	---	---	---	---	---	---	---
5634	Baugh & Sons Co., Norfolk, Va.	Baugh's 16 Per Cent Acid	Edenton	R	15.13	1.49	16.62	---	---	13.29
	---	Phosphate.	---	---	---	---	---	---	---	---
5818	Caraleigh Phosphate and Fer-	16 Per Cent Acid Phosphate	Spring Hope	R	13.88	1.78	15.66	---	---	12.53
	tilizer Works, Raleigh, N. C.	---	---	---	---	---	---	---	---	---
6068	Farmer's Guano Co., Raleigh,	---do---	Benson	D	13.90	2.50	16.40	---	---	13.12
	N. C.	---	---	---	---	---	---	---	---	---
5922	---do---	---do---	Franklinton	D	14.60	1.45	16.05	---	---	12.84
6081	Imperial Company, Norfolk, Va.	High Grade Tennessee Acid	Troy	N	13.85	1.05	14.90	---	---	11.92
	---	Phosphate.	---	---	---	---	---	---	---	---
5887	Patapasco Guano Co., Baltimore,	Florida Soluble Phosphate	Enfield	R	13.43	2.22	15.65	---	---	12.52
	Md.	---	---	---	---	---	---	---	---	---
5738	Powhatan Chemical Co., Rich-	Magie Dissolved Bone Phos-	Fremont	R	14.05	2.25	16.30	---	---	13.04
	mond, Va.	phate.	---	---	---	---	---	---	---	---
5750	Richmond Guano Co., Rich-	Rex Dissolved Bone Phosphate	Fremont	R	14.15	2.03	16.18	---	---	12.94
	mond, Va.	---	---	---	---	---	---	---	---	---
5882	Royster, F. S., Guano Co., Nor-	Royster's High Grade Acid	Edenton	D	14.20	2.09	16.29	---	---	13.03
	folk, Va.	Phosphate.	---	---	---	---	---	---	---	---
5751	Royster, F. S., Guano Co.,	Royster's High Grade Acid	Wilson	R	15.08	1.81	16.89	---	---	13.51
	Norfolk, Va.	Phosphate.	---	---	---	---	---	---	---	---
5859	Swift Fertilizer Works, Atlanta,	Swift's Special High Grade	Laurinburg	D	11.08	4.59	15.67	---	---	12.53
	Ga.	Acid Phosphate.	---	---	---	---	---	---	---	---
5870	Union Guano Co., Winston, N. C.	Union 16 Per Cent Acid Phos-	Clinton	D	10.98	6.06	16.04	---	---	12.83
	---	phate.	---	---	---	---	---	---	---	---
	Brands claiming	---	---	---	---	---	---	---	---	---
5905	Acme Mfg. Co., Wilmington,	Pure German Kainit	Clinton	S	---	---	12.00	---	---	12.00
	N. C.	---	---	---	---	---	13.22	---	---	13.22
5639	American Fertilizer Co., Nor-	Genuine German Kainit	Elizabeth City	R	---	---	12.40	---	---	12.40
	folk, Va.	---	---	---	---	---	---	---	---	---
5808	Armour Fertilizer Works,	---do---	Sunbury	S	---	---	11.71	---	---	11.71
	Baltimore, Md.	---	---	---	---	---	---	---	---	---
5942	Atlantic Chemical Co., Norfolk,	---do---	Concord	R	---	---	12.25	---	---	12.25
	Va.	---	---	---	---	---	---	---	---	---

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				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.			
RAW OR UNMIXED FERTILIZERS.																	
5662	Baugh & Sons Co., Norfolk, Va.	Genuine German Kainit	Edenton	S												12.82	
5700	Best & Thompson, Goldsboro, N. C.	do	Whiteville	S												12.96	
5860	Blackwell, R. J., Marion, S. C.	do	Maxton	S												12.05	
5753	Bragaw, Wm., & Co., Washington, N. C.	do	Washington	S												12.70	
5975	Burton, C. J., & Co., Baltimore, Md.	do	Edenton	S												12.08	
5724	Calder Bros., Wilmington, N. C.	do	Whiteville	S												12.96	
5891	Columbia Guano Co., Norfolk, Va.	do	Littleton	S												12.97	
5890	Farmer's Cotton Oil Co., Wilson, N. C.	do	Battleboro	R												12.61	
5753	Hadley, Harris & Co., Wilson, N. C.	do	Wilson	S												13.36	
5615	Hubbard Fertilizer Co., Baltimore, Md.	do	Washington	S												13.92	
5771	Imperial Company, Norfolk, Va.	do	Edenton	S												13.05	
5861	McNair, J. F., Laurinburg, N. C.	do	Laurinburg	S												12.34	
5788	Navassa Guano Co., Wilmington, N. C.	do	Warsaw	S												13.17	
5889	Norfolk Fertilizer Co., Norfolk, Va.	do	Sharpsburg	B												12.25	
6014	Patapsco Guano Co., Baltimore, Md.	do	Lewiston	S												12.96	
5603	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	do	Edenton	S												12.58	
5626	Pocomoke Guano Co., Norfolk, Va.	do	Washington	S												12.96	
5740	Powhatan Chemical Co., Richmond, Va.	do	Fremont	R												13.00	
5739	Richmond Guano Co., Richmond, Va.	do	Fremont	R												12.46	

5887	Royster, F. S., Guano Co., Norfolk, Va.	do	New Bern	12.44	12.44
6162	Tuscarora Fertilizer Co., Wilmington, N. C.	do	Rose Hill	13.42	13.42
5871	Union Guano Co., Winston, N. C.	do	Clinton	12.60	12.60
5625	Virginia-Carolina Chemical Co., Richmond, Va.	do	Greenville	12.20	12.20
5590	Winborne Guano Co., Tyner, N. C.	do	Edenton	12.78	12.78
Brands claiming					
5989	Baugh & Sons Co., Norfolk, Va.	Muriate of Potash	Concord	48.00	48.00
5862	McNair, J. F., Laurinburg, N. C.	do	Laurinburg	48.60	48.60
6070	Navassa Guano Co., Wilmington, N. C.	do	Benson	50.00	50.00
				51.40	51.40
Brands claiming					
6011	Calder Bros., Wilmington, N. C.	Muriate of Potash	McDonald	50.00	50.00
6012	Cooper, W. B., Wilmington, N. C.	do	Ashpole	50.20	50.20
				50.72	50.72
6053	Farmer's Cotton Oil Co., Wilson, N. C.	do	Benson	49.67	49.67
Brands claiming					
5984	Coe-Mortimer Co., Charleston, S. C.	Nitrate of Soda	Benson	18.00	18.00
				18.80	18.80
6071	Kirkwood, R. L. & Co., Bennettsville, S. C.	do	Benson	18.80	18.80
Brands claiming					
5770	Imperial Company, Norfolk, Va.	do	Edenton	19.00	19.00
6140	Pocomoke Guano Co., Norfolk, Va.	do	Charlotte	18.72	18.72
				18.64	18.64
6139	Royster, F. S., Guano Co., Norfolk, Va.	do	Lincolnton	18.80	18.80
5782	Southern Exchange Co., Maxton, N. C.	do	Maxton	18.84	18.84
5699	Va-Car. Chemical Co., Richmond, Va.	do	Goldsboro	19.04	19.04
Brands claiming					
5640	Lee, A. S. & Sons Co., Richmond, Va.	Lee's Agricultural Lime	Edenton	2.00	2.00
				2.16	2.16
Brands claiming					
5777	Coe-Mortimer Company, Charles- ton, S. C.	Genuine Peruvian Guano	Maxton	8.50	8.50
				9.12	9.12
6048	Coe-Mortimer Company, Charles- ton, S. C.	Genuine Peruvian Guano	Benson	9.00	9.00
				9.14	9.14

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^a Total Phosphoric Acid found 9.65, valued at 3½ cents per pound.

^b Total Phosphoric Acid found 9.53, valued at 3½ cents per pound.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1907—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts Per 100.										Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-Soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
RAW OR UNMIXED FERTILIZERS.															
5776	Brands claiming Coe-Mortimer Company, Charles- ton, S. C.	Genuine Peruvian Guano	Maxton	R							4.00	2.75			\$ c27.71
6169	do	do	Statesville	R							3.74	2.83			d29.30
6183	do	do	Battleboro	R							3.92	2.78			e28.03
6044	Brands claiming Va.-Car. Chemical Co., Rich- mond, Va.	Va.-Car. Chemical Co.'s Pure Raw Bone	Greensboro	S							4.50	2.95			f28.59

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—flir; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

c Total Phosphoric Acid found 18.98, valued at $3\frac{1}{2}$ cents per pound.

d Total Phosphoric Acid found 20.53, valued at $3\frac{1}{2}$ cents per pound.

e Total Phosphoric Acid found 19.10, valued at $3\frac{1}{2}$ cents per pound.

f Total Phosphoric Acid found 19.95, valued at $3\frac{1}{2}$ cents per pound.

II.—ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Am- monia Guar- anteed.	Per Cent Ammonia Found.
2127	Battleboro Oil Co., Battleboro, N. C.	Battleboro		7.36
2130	do	do		7.10
2134	do	do		7.32
2138	do	do		7.36
2139	do	do		7.94
2148	do	do		8.08
2149	do	do		8.06
2176	do	do		8.02
2177	do	do		7.52
2178	do	do		7.54
2236	do	do		7.92
2237	do	do		7.62
2161	Bragaw, William, & Co., Washington, N. C.	Washington	7.50	7.72
2105	Clayton Oil Mill, Clayton, N. C.	Clayton		7.89
2142	do	do		7.64
2165	do	do		7.84
2158	Consumers Cotton Oil Co., Tarboro, N. C.	Elizabeth City	7.50	7.62
2115	Conyers Oil Co., Conyers, Ga.	Murphy	7.50	8.05
2186	Cotton Oil and Ginning Co., Scotland Neck, N. C.	Scotland Neck	7.50	7.54
2189	do	do		7.76
2190	do	do		7.52
2204	do	do	7.50	7.06
2214	do	do	7.50	7.72
2150	Eastern Cotton Oil Co., Hertford, N. C.	Hertford	7.50	7.30
2162	do	Edenton	7.50	6.98
2188	do	Sunbury	7.50	7.06
2230	do	Edenton	7.50	6.76
2264	Edgecombe Oil Co., Tarboro, N. C.	Speed	7.50	6.76
2194	Elba Manufacturing Co., Charlotte, N. C.	Laurel Hill	7.50	7.60
2229	do	Albemarle	7.50	8.08
2116	do	Waynesville	7.50	7.32
2212	Farmer's Cotton Oil Co., Wilson, N. C.	Wilson	7.50	8.18
2213	do	do	7.50	7.88
2128	Farmer's Oil Mill Co., Nashville, N. C.	Nashville		7.82
2129	do	do		7.56
2163	Fremont Oil Mill Co., Fremont, N. C.	Fremont		8.06
2173	do	do	7.50	7.90
2250	do	Bethel	7.50	7.62
2256	Georgia Cotton Oil Co., Atlanta, Ga.	Murphy	7.50	7.34
2255	Greensboro Cotton Oil Co., Greensboro, Ala.	Hickory	7.50	8.04
2257	do	Morganton	7.50	7.86
2258	do	Mount Airy	7.50	7.66
2159	Haven's Oil Co., Washington, N. C.	Edenton	7.50	8.02
2209	do	Washington	7.50	7.66
2172	Henderson Cotton Oil Co., Henderson, N. C.	Weldon		7.32
2169	Humphreys, Godwin & Co., Memphis, Tenn.	Washington	7.50	7.12
2195	do	Enfield	7.50	7.72
2274	do	do	7.50	8.00
2155	Kershaw Oil Mill Co., Kershaw, S. C.	Asheville	7.50	7.56
2184	Laurinburg Oil Co., Laurinburg, N. C.	Maxton	7.50	8.66
2203	do	Old Hundred		7.46
2200	do	Sardis	7.50	7.44
2107	Lenoir Oil and Ice Co., Kinston, N. C.	Kinston		7.02
2146	do	do		7.62
2131	do	do		8.24
2270	Lorena Cotton Oil Mills, Mooresville, N. C.	Mooresville	7.50	7.98
2228	Louisburg Oil Mills, Louisburg, N. C.	Louisburg		7.94
2197	Lumberton Cotton Oil Co., Lumberton, N. C.	Wadesboro	7.50	7.18
2273	do	Raeford	7.50	7.50
2104	Morgan Oil and Fertilizer Co., Red Springs, N. C.	Red Springs		7.32
2170	New Bern Cotton Oil and Fertilizer Co., New Bern, N. C.	New Bern	7.50	7.98
2210	do	do	7.50	7.58
2198	North Carolina Cotton Oil Co., Henderson, N. C.	Youngsville	7.50	7.12
2252	do	Weldon	7.50	7.24
2207	North Carolina Cotton Oil Co., Raleigh, N. C.	Wake Forest	7.50	6.84
2284	do	Raleigh		7.42

ANALYSES OF COTTON-SEED MEAL—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Am- monia Guar- anteed.	Per Cent. Ammonia Found.
2152	North Carolina Cotton Oil Co., Raleigh, N. C.	Mt. Olive	7.50	7.56
2168	do	Wilmington	7.50	7.18
2196	do	Enfield	7.50	7.16
2220	do	Mt. Tabor	7.50	7.02
2231	do	Kelford	7.50	6.96
2133	do	Ingold	7.50	6.70
2260	Pauline Oil Mill, Glenn Springs, S. C.	Asheville	7.50	7.94
2124	Pine Level Oil Mill Co., Pine Level, N. C.	do	7.50	7.75
2187	Pine Tops Oil and Guano Co., Pine Tops, N. C.	Pine Tops	7.50	7.44
2122	Rowland Oil and Fertilizer Co., Rowland, N. C.	Rowland	7.50	6.92
2126	do	do	7.50	7.72
2248	Southern Cotton Oil Co., Charlotte, N. C.	Raleigh	7.50	7.76
2238	do	do	7.50	7.66
2114	do	Lincolnton	7.50	7.18
2192	do	Williamston	7.50	7.52
2199	Southern Cotton Oil Co., Fayetteville, N. C.	Red Springs	7.50	7.23
2151	Southern Cotton Oil Co., Goldsboro, N. C.	Goldsboro	7.50	8.00
2171	do	do	7.50	7.46
2249	do	do	7.50	7.30
2232	do	Kelford	7.50	7.16
2206	do	Mt. Olive	7.50	7.20
2191	do	Edenton	7.50	7.10
2205	Southern Cotton Oil Co., Monroe, N. C.	Monroe	7.50	7.28
2233	Southern Cotton Oil Co., Tarboro, N. C.	Palmyra	7.50	7.64
2160	do	Greenville	7.50	7.70
2185	Southern Cotton Oil Co., Wilson, N. C.	Sharpsburg	7.50	7.38
2164	do	Whitakers	7.50	7.16
2251	South Atlantic Oil Co., Wadesboro, N. C.	Morven	7.50	7.66
2106	Spring Hope Cotton Oil Co., Spring Hope, N. C.	Spring Hope	7.50	7.95
2153	Statesville Oil and Fertilizer Co., Statesville, N. C.	Statesville	7.50	8.00
2272	do	Winston	7.50	7.60
2221	do	Lexington	7.50	7.82
2154	Victor Cotton Oil Co., Gaffney, S. C.	Asheville	7.50	7.38
2243	Wells J. Lindsay Co., Memphis, Tenn.	Murphy	7.50	7.76
2244	do	Murphy	7.50	7.26
2271	do	Scotland Neck	7.50	7.68
2215	do	Scotland Neck	8.00	7.50
2259	do	Asheville	8.00	7.58
2179	do	Scotland Neck	8.00	7.66

III. FERTILIZER BRANDS REGISTERED FOR 1907.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Geo. L. Arps & Co., Norfolk, Va.—</i>			
Geo. L. Arps & Co.'s Big Yield Guano.....	8	2	2
14 Per Cent Acid Phosphate.....	14	..	..
High Grade Premium Guano.....	8	2	2
Kainit .....	..	..	12
Arps' Potato Guano.....	6	7	5
Arps' Standard Truck Guano.....	7	5	5
Arps' Scuppernon Guano for Truck.....	6	5	7
<i>Alabama Cotton Oil Co., Huntsville, Ala.—</i>			
Cotton-seed Meal.....	..	7.50	..
<i>Atlantic Chemical Co., Norfolk, Va.—</i>			
Atlantic 7 Per Cent Truck Guano.....	7	7	7
Atlantic Potato Guano.....	7	5	5
Atlantic Special Truck Guano.....	8	4	4
Atlantic High Grade Cotton Guano.....	8	3	3
Atlantic High Grade Tobacco Guano.....	8	3	3
Atlantic Meal Compound	9	2.75	2
Atlantic Tobacco Grower.....	8	2.50	3
Atlantic Tobacco Compound.....	8	2.50	2
Atlantic Soluble Guano.....	8	2	2
Atlantic Special Wheat Fertilizer.....	8	2	2
Atlantic Cotton Grower.....	8	2.50	1
Atlantic Special Guano.....	8	2	1
Atlantic 8 and 2 Bone and Potash Mixture.....	8	..	2
Atlantic 8 and 4 Bone and Potash Mixture.....	8	..	4
Atlantic Bone and Potash Mixture.....	10	..	2
Atlantic Bone and Potash for Grain.....	10	..	3
Atlantic 10 and 4 Bone and Potash Mixture.....	10	..	4
Atlantic Acid Phosphate.....	12	..	..
Atlantic High Grade Dissolved Bone.....	13	..	5
Atlantic 14 Per Cent Acid Phosphate.....	14	..	..
Atlantic High Grade 16 Per Cent Acid Phosphate..	16	..	..
Oriental High Grade Guano.....	8	4	4
Perfection Peanut Grower.....	7	..	5
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
Cotton-seed Meal .....	..	7.50	..
<i>The Armour Fertilizer Works, Baltimore, Md.—</i>			
12 Per Cent Acid Phosphate.....	12	..	..
13 Per Cent Acid Phosphate.....	13	..	..
Star Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..
Phosphate and Potash No. 1.....	10	..	2
Phosphate and Potash No. 2.....	8	..	5
Wheat Grower	10	..	4
Phosphoric Acid and Potash.....	10	..	5
Top Dresser	5	10	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
10 Per Cent Trucker.....	5	10	3
Ammoniated Bone with Potash.....	6	3	2
Manure Substitute	6	4	4
7 Per Cent Trucker.....	6	7	5
General	8	2	2
Fruit and Root Crop Special.....	8	2	5
High Grade Potato.....	8	2	10
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Cotton Special.....	8	3	3
Tobacco Special	8	3	3
Truck and Berry Special.....	8	3	10
All Soluble	8	3.50	4
Special Trucker	8	4	4
Bone, Blood and Potash.....	8	5	7
Bone and Dissolved Bone with Potash.....	9	2	3
African Cotton Grower.....	9	3	3
10 Per Cent Tankage.....	..	10	..
M. H. White & Co.'s Special Corn Mixture.....	10	..	2
Bone Meal	(Total) 24	3	..
Acidulated Bone Meal	18	2	..
Raw Bone Meal	(Total) 22	4.50	..
German Kainit .....	..	..	12
16 Per Cent Kainit.....	..	..	16
Dried Blood .....	..	16	..
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Superphosphate and Potash.....	10	..	4
Armour Sweet Potato Special.....	8	2.50	3
Armour Slaughter House Fertilizer.....	8	2	2
Armour's Defiance	8	2.50	3

Acme Manufacturing Co., Wilmington, N. C.—

Acme Fertilizer	8	3	2.50
Acme Fertilizer for Tobacco.....	8	3	2.50
Acme Truck Grower.....	6	4	8
Acme Cotton Grower.....	9	2.75	2
Acme Standard Guano.....	8	2.50	2
Acme Soluble Bone	8	2.50	1
Acme Special Grain Fertilizer.....	8	2	2
Acme High Grade Guano.....	6	6	8
Acme High Grade Acid Phosphate.....	14	..	..
Acme Ammoniated Dissolved Bone	8	2	1
Acme Acid Phosphate.....	13	..	..
Acme Strawberry Top Dressing.....	8	2	4
Lattimore's Complete Fertilizer.....	8	2.50	2
Cotton-seed Meal Guano.....	8	2	2
Quick Step	8	4	4
Pee Dee Special.....	8	3	3
16 Per Cent Acid Phosphate.....	16	..	..
Gem Fertilizer	8	2	2
Acid Phosphate	12	..	..
Bone and Potash.....	11	..	2
Bone and Potash.....	8	..	4
Bone and Potash.....	8	..	3
Bone and Potash.....	8	..	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bone and Potash.....	10	..	4
Bone and Potash.....	10	..	3
Bone and Potash.....	10	..	2
Tip Top Crop Grower.....	8	2.50	3
Pure German Kainit.....	..	..	12
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	48
Tip Top Tobacco Grower.....	8	2.50	3

Asheville Packing Co., Asheville, N. C.—

Asheville Packing Co.'s Special Potato Fertilizer...	8	2	7
Asheville Packing Co.'s Garden Fertilizer.....	8	5	5
Asheville Packing Co.'s General Fertilizer.....	8	2	2
Asheville Packing Co.'s S—2—1.....	8	2	1
Asheville Packing Co.'s Special Bone Potash.....	10	..	4
Asheville Packing Co.'s Blood and Bone.....	8	3	3
Asheville Packing Co.'s Bone Potash.....	10	..	2
Bone Potash	8	..	4
Farmer's Potato Fertilizer	10	..	6

Ashepool Fertilizer Co., Charleston, S. C.—

Ashepool Watermelon Guano.....	10	4	5
Ashepool Fertilizer	9	2.25	1
Ashepool Harrow Brand Raw Bone Superphosphate.	9	2	2
Ashepool Wheat and Oats Specific.....	9	2	1
Ashepool XXX Guano.....	8.65	2	2
Ashepool XX Guano.....	8.50	2	2
Ashepool Fruit Grower.....	8	4.75	2.75
Ashepool Perfection Guano.....	8	4	6
Ashepool High Grade Guano.....	8	4	4
Ashepool Golden Tobacco Producer.....	8	3	3
Ashepool X Tobacco Fertilizer.....	8	3	3
Ashepool Bird and Fish Guano.....	8	3	3
Ashepool Meal Mixture.....	8	3	3
Ashepool High Grade Ammoniated Superphosphate.	8	3	2
Ashepool Special Cotton-seed Meal Guano.....	8	3	2
Ashepool Farmers' Special.....	8	2.50	3
Ashepool Circle Guano.....	8	2.50	2
Ashepool Guano	8	2.50	1
Ashepool Special Fertilizer.....	8	2	2
Ashepool Truck Guano.....	7	5	5
Ashepool Vegetable Guano.....	5	5	5
Ashepool High Grade Acid Phosphate Potash.....	12	..	1
Ashepool Potash Acid Phosphate.....	11	..	1
Ashepool Superpotash Acid Phosphate.....	10	..	4
Ashepool Potash Compound.....	10	..	3
Ashepool Dissolved Phosphate.....	16	..	..
Ashepool XXXX Acid Phosphate.....	14	..	..
Ashepool High Grade Acid Phosphate.....	13	..	..
Ashepool XXX Acid Phosphate.....	13	..	..
Ashepool Dissolved Bone.....	12	..	..
Ashepool XX Acid Phosphate.....	12	..	..
Eutaw High Grade Acid Phosphate.....	13	..	..
Eutaw XX Acid Phosphate.....	12	..	..
Eutaw Superpotash Acid Phosphate.....	10	..	4
Eutaw Potash Acid Phosphate.....	11	..	1
Eutaw High Grade Acid Phosphate and Potash....	12	..	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Eutaw X Golden Fertilizer.....	8	3	4
Eutaw Special Cotton-seed Meal Guano.....	8	3	4
Eutaw XX Guano.....	8.50	2	2
Eutaw XXX Guano.....	9	2	2
Eutaw Fertilizer	9	2.25	1
Eutaw Circle Guano.....	8	2.50	2
P. D. Fertilizer.....	8	2	1
Circle Bone	13	..	..
Brownwood Acid Phosphate.....	8	..	4
Enoree Acid Phosphate.....	10	..	2
Taylor's Circle Guano.....	9	2	4
Palmetto Potash Acid Phosphate.....	11	..	..
Carolina High Grade Acid Phosphate.....	13	..	..
Carolina Guano	8	2	2
Carolina XXX Guano.....	8	3	3
Coomassie Acid Phosphate.....	12	..	..
Coomassie Circle Fertilizer.....	8	2	2
Muriate of Potash.....	..	..	45
Nitrate of Soda.....	..	18	..
German Kainit .....	..	..	12

A. D. Adair and McCarty Bros., Atlanta, Ga.—

David Harum Extra High Grade Guano.....	10	4	4
Adair's High Grade Blood and Bone.....	10	3	3
Adair's Soluble Pacific Guano.....	10	2	2
Adair's Ammoniated Dissolved Bone.....	8	2	2
Planter's Soluble Fertilizer C. S. M.....	8	2	2
Adair's Blood and Bone.....	9	2	1
A. and M. 13-4.....	13	..	4
High Grade Potash Compound.....	10	..	4
Adair's Wheat and Grass Grower.....	10	..	4
Adair's Special Potash Mixture.....	8	..	4
Adair's Formula	10	..	2
Adair's High Grade Dissolved Bone.....	16	..	..
Adair's Dissolved Bone.....	12	..	..
Special Wheat Compound.....	10	2	4
Special Cotton Compound.....	10	2	4

Anderson Phosphate and Oil Co., Anderson, S. C.—

Anderson Extra Best Guano.....	10	4	4
Anderson Special Fertilizer.....	8	3	3
Anderson Truck Fertilizer.....	8	4	4
Anderson XXXX Potash Bone.....	10	..	4
Anderson Cotton Fertilizer.....	8	2	2
Anderson XXX Potash Bone.....	8	..	4
Anderson XXXXX Potash Bone	12	..	2
Anderson Superphosphate	16	..	..
Anderson XX Potash Bone.....	10	..	2
Anderson Special Dissolved Bone.....	14	..	..
Anderson Special Potash Dissolved Bone.....	15	..	..
Anderson High Grade Dissolved Bone.....	13	..	..
Anderson Extra Guano.....	9	2	3
Anderson Kainit .....	..	..	12

American Agricultural Chemical Co., New York, N. Y.—

Holmes & Dawson Productive Cotton and Peanut Grower	9	2.75	2
Holmes & Dawson Gold Dust Guano.....	9	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Holmes & Dawson Triumph Soluble.....	8	2	2
Savage Sons & Co.'s Purity Guano.....	8	2	2
Victor Truck Phosphate.....	8	4	7
Zell's 10 Per Cent Trucker.....	5	10	3
Zell's 7 Per Cent Potato and Vegetable Manure....	6	7	5
Zell's Truck Guano.....	7	5	5
Zell's Special Compound for Potatoes and Vegetables	8	3	4
Zell's Tobacco Fertilizer.....	8	3	4
Zell's Bright Tobacco Grower.....	8	3	3
Zell's Reliance High Grade Manure.....	8	3	3
Zell's Royal High Grade Fertilizer.....	9	2.50	2
Zell's Calvert Guano.....	8	2	2
Zell's Special Compound for Tobacco.....	8	2	2
Zell's Ammoniated Bone Superphosphate.....	8	2	1
Zell's High Grade Potash Fertilizer.....	10	..	4
Zell's Electric Phosphate.....	10	..	2
Zell's Dissolved Bone Phosphate.....	14	..	..
Detrick's Virginia Trucker.....	6	7	7
Detrick's Gold Basis.....	6	7	5
Detrick's High Grade Potato Manure.....	4	7	5
Detrick's Special Trucker.....	7	5	5
Detrick's Trucker's Bone Phosphate.....	4	5	9
Detrick's Gold Eagle.....	6	3	6
Detrick's Quickstep Bone Phosphate.....	8	3	4
Detrick's Special Tobacco Fertilizer.....	8	3	3
Detrick's Vegetator Ammoniated Superphosphate...	8	2.50	3
Detrick's Kangaroo Komplete Kompound.....	8	2	3
Detrick's Royal Crop Grower.....	8	2	2
Detrick's Fish Mixture.....	8	2	2
Detrick's Ammoniated Bone.....	8	2	1.50
Detrick's Victory Alkaline Bone.....	12	..	5
Detrick's P. and B. Special.....	12	..	3
Detrick's Soluble Bone Phosphate and Potash.....	10	..	2
Detrick's XXtra Acid Phosphate.....	14	..	..
Lazaretto Truck Grower.....	5	10	3
Lazaretto Truckers' Favorite.....	6	7	5
Lazaretto Early Trucker.....	7	5	5
Lazaretto Challenge Fertilizer.....	8	3	3
Lazaretto Special for Tobacco and Potatoes.....	8	3	3
Lazaretto Climax Plant Food.....	8	2.50	3
Lazaretto Universal Compound	8	2.50	2
Lazaretto Crop Grower.....	8	2	2
Lazaretto High Grade Dissolved Bone and Potash..	12	..	5
Lazaretto Alkaline Bone Phosphate.....	12	..	3
Lazaretto Dissolved Bone and Potash.....	10	..	2
Lazaretto Acid Phosphate.....	14	..	2
Canton Chemical Truckers' Special 10 Per Cent....	5	10	3
Canton Chemical Truckers' Special 7 Per Cent....	6	7	5
Canton Chemical Excelsior Trucker.....	7	5	5
Canton Chemical Baker's Tobacco Fertilizer.....	8	3	3
Canton Chemical Superior High Grade Fertilizer...	8	3	3
Canton Chemical C. C. Special Compound.....	8	2.50	6
Canton Chemical Baker's Standard High Grade Guano	8	2.50	3
Canton Chemical Virginia Standard High Grade Manure.....	8	2.50	2
Canton Chemical Game Guano.....	8	2	2
Canton Chemical Soluble Alkaline Bone.....	12	..	3
Canton Chemical Soluble Bone and Potash.....	10	..	2
Canton Chemical Baker's Dissolved S. C. Bone.....	14	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bull Head Potato and Vegetable Manure.....	6	5	7
Honey Pod Trucker.....	7	5	8
Bell's Victoria Animal Bone Compound.....	9	2.25	4
Lazaretto Retriever Animal Bone Fertilizer.....	9	2.25	4
Canton Chemical Animal Bone Fertilizer.....	9	2.25	4
Detrick's Superior Animal Bone Fertilizer.....	9	2.25	4
Slingluff's British Mixture.....	8	2.50	2.50
Zell's Fish Guano	8	2	2
Enterprise Alkaline Phosphate	8	..	5

American Fertilizer Co., Norfolk, Va.—

10 Per Cent Ammonia Guano.....	7	10	2.50
Standard 7 Per Cent Ammoniated Guano.....	7	7	5
American Irish Potato Grower.....	7	5	5
American 7-7-7 for Irish Potatoes.....	7	7	7
Special Potato Manure.....	6	5	7
Special Potato Guano.....	7	5	7
Strawberry Guano	9	3.50	9
Stable Manure Substitute.....	7	3	4
American Fish Scrap Guano.....	7	4	4
Kale, Spinach and Cabbage Guano.....	7	5	4
American Ammoniated Bone.....	8	2	1
Peruvian Mixture	8	2	1.50
American No. 1 Fertilizer.....	8	2.50	3
American No. 2 Fertilizer.....	8	2	2
Blood and Bone Compound.....	8	2.50	1
Bone and Peruvian Guano.....	8.50	2	2.10
Bone and Peruvian Guano for Tobacco.....	8	2	2
American Cotton Compound.....	8	2	2
Bob White Fertilizer for Tobacco.....	8	2.50	2.50
American Eagle Guano.....	8	3	3
Murray's Special Fertilizer.....	8	3	3
J. G. Miller & Co.'s Yellow Leaf Tobacco.....	8	3	3
Special Formula Guano for Yellow Leaf Tobacco...	9	3.50	5
Pitt County Special Fertilizer.....	9	3.50	5
Double Dissolved Bone and Potash.....	10	..	4
American Special Potash Mixture for Wheat.....	8	..	2
Dissolved Bone and Potash for Corn and Wheat....	10	..	2
American High Grade Acid Phosphate.....	16	..	..
High Grade Acid Phosphate.....	14	..	..
Eagle High Grade Acid Phosphate.....	13	..	..
Acid Phosphate	12	..	..
Acid Phosphate	10	..	..
A. L. Hannok's Special Formula Guano.....	8	2	2
Bone and Peruvian Guano.....	8	2	2
Peruvian Mixture Guano especially prepared for Sweet Potatoes	8	4	5
Pure Dissolved Bone.....	14	2.50	..
Ground Fish Scrap.....	..	10	..
Bone Meal	21	4.50	..
Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	49
Muriate of Potash.....	..	..	50
W. B. Cooper's High Grade Acid.....	14	..	..
W. B. Cooper's Cape Fear Acid.....	13	..	..
W. B. Cooper's Cotton Grower	8	2	2
W. B. Cooper's Pure German Kainit.....	..	..	12
N. C. and S. C. Cotton Grower.....	8	4	4
Johnson's No. 1 Fertilizer	8	2.50	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash
<i>The John L. Bailey Co., Elm City, N. C.—</i>			
Stag Brand	8	2	2
Fairmount	8	3	3
<i>Baugh & Sons Co., Philadelphia, Pa., and Norfolk, Va.—</i>			
Baugh's 5-6-5 Guano.....	6	5	5
Baugh's Sweet Potato Guano.....	8	3	3
Baugh's 16 Per Cent Acid Phosphate.....	16	..	..
Baugh's Fine Ground Fish.....	10	..	..
Baugh's High Grade Acid Phosphate.....	14	..	..
Baugh's Soluble Alkaline Superphosphate.....	10	..	2
Baugh's High Grade Potash Mixture.....	10	..	4
Baugh's 12-5 Phosphate and Potash.....	12	..	5
Baugh's Cabbage Guano.....	6	7	5
Baugh's Fruit and Berry Guano.....	8	3	10
Baugh's Wheat Fertilizer for Wheat and Grass....	8	2	2
Baugh's Fish Bone and Potash.....	8	4	4
Baugh's Fish Mixture	8	2	2
Baugh's 7 Per Cent Potato Guano.....	6	7	5
Baugh's New Process 10 Per Cent Guano.....	5	10	2.50
Baugh's Grand Rapid High Grade Truck Guano....	8	3	3
Baugh's High Grade Tobacco Guano.....	8	3	3
Baugh's Animal Bone and Potash Compound.....	8	2	2
Baugh's Pure Dissolved Animal Bone.....	13	2.50	..
Baugh's Raw Bone Meal.....	21.50	4.50	..
Baugh's Peruvian Guano Substitute for Potatoes and all Vegetables	6	5	7
Baugh's Double Eagle Twenty-five Dollar Phosphate and Raw Bone Superphosphate.....	8	2	1
Glover's Special Potato Grower.....	7	4	8
Benthol's Cotton and Peanut Grower.....	8	2	2
Genuine German Kainit.....	..	..	12
Fine Ground Blood.....	..	16	..
Nitrate of Soda.....	..	18.50	..
Sulphate of Ammonia.....	..	25	..
High Grade Sulphate of Potash.....	..	..	48
Muriate of Potash.....	..	..	48
Baugh's Special Tobacco Guano.....	8	3	5
Baugh's High Grade Cotton and Truck Guano.....	10	2	2
Baugh's Special Manure for Melons.....	10	4	4
Baugh's Potato and Truck Special.....	7	3.50	7
Baugh's Complete Animal Bone Fertilizer.....	8	2	5
Baugh's Special Potato Manure.....	5	2	10
Baugh's Special Guano.....	8	4	6
<i>J. A. Benton, Ruffin, N. C.—</i>			
N. C. Bright Fertilizer	9	2	2
<i>R. J. Blackwell, Marion, S. C.—</i>			
German Kainit .....	..	..	12
<i>Bradley Fertilizer Co., Boston, Mass., and Charleston, S. C.—</i>			
B. D. Sea Fowl Guano.....	9	2.25	1
Bradley's Patent Superphosphate.....	9	2.25	1
Bradley's High Grade Guano.....	8	3	3
Bradley's Ammoniated Dissolved Bone.....	8	2.25	1
Eagle Ammoniated Bone Superphosphate.....	8	2.25	1
Bradley's Cereal Guano.....	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bradley's X Guano.....	8	2	2
Bradley's Wheat Guano.....	10	..	2
Bradley's High Grade Acid Phosphate.....	14	..	..
Bradley's XXX Acid Phosphate.....	13	..	..
Bradley's Acid Phosphate.....	12	..	..
Bradley's Palmetto Acid Phosphate.....	12	..	..
German Kainit .....	..	..	12
Bradley's Bone and Potash.....	10	..	2
Bradley's O. Special Guano.....	8	4	4
<i>O. J. Burton Guano Co., Baltimore, Md.—</i>			
Burton's Best	8	3	3
Burton's Butcher Bone.....	8	2	2
Burton's Soluble Guano.....	8	2	1
Burton's High Grade.....	8	2.50	3
Burton's High Grade Tobacco.....	8	4	4
Tobacco Queen	8	3	3
Acid Phosphate	14	..	..
<i>J. L. Bailey & Co., Elm City, N. C.—</i>			
Stag Brand	8	2	2
Fairmount	8	3	3
<i>R. R. Barnes, Barnesville, S. C.—</i>			
Nitrate of Soda .....	..	19	..
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Resolute Acid Phosphate 16 Per Cent.....	16	..	..
Laurel Potash Mixture.....	10	..	2
Victory Special Crop Grower.....	7	4	4
Berkley Plant Food.....	10	..	4
Berkley Bone and Potash Mixture.....	11	..	2
Berkley Genuine German Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Berkley Acid Phosphate.....	14	..	..
Berkley Ammoniated Superphosphate.....	8	2	1
Mascot Truck Guano.....	7	5	5
Royal Truck Grower.....	6	7	5
Advance Crop Grower.....	8	3	3
Berkley Tobacco Guano.....	8	3	3
Brandon Superphosphate	8	2	2
Select Crop Guano.....	8.50	2.50	2.50
Monitor Animal Bone Fertilizer.....	9	2.25	4
<i>William Bragaw & Co., Washington, N. C.—</i>			
Pamlico Trucker	7	5	8
Tar Heel Special Guano.....	8	2	2
Havana Tobacco Guano	8	3	3
Beaufort County Guano	8	3	3
Tuckahoe Tobacco Guano	8	2.50	3
Chocowinity Special Tobacco	5	4	6
Old Reliable Premium	8	2	2
Cotton-seed Meal .....	..	7.50	..
<i>Blackstone Guano Co., Inc., Blackstone, Va.—</i>			
Old Bellefonte	8	4	2
Jim Crow for Tobacco.....	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Red Letter	8	2	2
Red Warrior for Tobacco.....	9	3	3
Blackstone Special for Tobacco.....	9	3	3
Alliance Guano	8	2	2
Alliance Guano for Tobacco	8	2	2
B. G. Co. Inc. Mixed Bone and Potash.....	10	..	4
B. G. Co. Inc. Mixed Acid Phosphate.....	14	..	..
Hard Cash	8	2.50	2
Bellefonte.....	8	3	2
<i>Best & Thompson, Goldsboro, N. C.—</i>			
Pure German Kainit.....	..	..	12
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano	8	3	3
Clayton Cotton Grower.....	8	2	2
<i>Columbia Guano Co., Norfolk, Va.—</i>			
Columbia 7 Per Cent Truck Guano.....	7	7	7
Columbia Potato Guano	7	5	5
Columbia Special Truck Guano	8	4	4
Columbia Soluble Guano	8	2	2
Columbia Special 4-8-3.....	8	4	3
Columbia H. G. Special Tobacco Guano.....	8	2.50	2
Columbia Special Wheat Fertilizer.....	8	2	2
Columbia Special	8	4	3
Columbia C. S. M. Special.....	9	2.75	2
Columbia 8 and 2 Bone and Potash Mixture.....	8	..	2
Columbia 8 and 2.25 Bone and Potash Mixture....	8	..	2.25
Columbia 8 and 4 Bone and Potash Mixture.....	8	..	4
Columbia Bone and Potash Mixture.....	10	..	2
Columbia Bone and Potash for Grain.....	10	..	3
Columbia 10 and 4 Bone and Potash Mixture.....	10	..	4
Columbia Acid Phosphate	12	..	..
Columbia H. G. Dissolved Bone.....	13	..	..
Columbia 14 Per Cent Acid Phosphate	14	..	..
Columbia H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Rex Brand Ammoniated Guano.....	8	2.50	1
Carolina Soluble Guano	8	2	1
Crown Brand Peanut Guano	7	..	5
McRae's Special	9	5	7
Hayes' Special	8	4	3
Crews' Special	5	5	10
McRae's High Grade Guano	8	4	7
Pelican Ammoniated Guano	8	4	4
Hycobacco Guano	8	3	3
Olympia Cotton Guano.....	8	3	3
Genuine German Kainit .....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Cotton-seed Meal .....	..	7.50	..
Our Best Meal Guano	8	3	3
<i>Cumberland Bone and Phosphate Co., Portland, Maine, and Charleston, S. C.—</i>			
Cumberland Bone and Superphosphate of Lime....	8	2.25	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Cowell, Swan & McCotter Co., Bayboro, N. C.—</i>			
Cowell, Swan & McCotter Co.'s Bone Phosphate.....	14	..	..
Cowell, Swan & McCotter Co.'s Crop Guano.....	8	2	2
Cowell, Swan & McCotter Co.'s Bone and Fish.....	8	2	2
Cowell, Swan & McCotter Co.'s 14 Per Cent Acid Phosphate	14	..	..
Cowell, Swan & McCotter Co.'s Rust Proof Cotton Guano	8	2	3
Cowell, Swan & McCotter Co.'s Standard Cotton Grower.....	8	4	3
Cowell, Swan & McCotter Co.'s Quick Grower Guano.....	8	2.50	3
Cowell, Swan & McCotter Co.'s Great Cabbage and Potato Guano	7	7	7
Cowell, Swan & McCotter Co.'s Aurora Trucker....	7	5	7
Cowell, Swan & McCotter Co.'s Oriental Trucker....	7	5	8
Cowell, Swan & McCotter Co.'s High Grade Truck Guano	7	5	5
Cowell, Swan & McCotter Co.'s Potato Favorite Guano	7	4	7
Cowell, Swan & McCotter Co.'s Champion Guano....	8	3	3
Cowell, Swan & McCotter Co.'s German Kainit....	..	..	12
Cowell, Swan & McCotter Co.'s Tobacco Guano.....	8	3	3
Cowell, Swan & McCotter Co.'s Cabbage Guano.....	5	10	2.50
Carawan's Special	6	3	4
Camlin's Special	7	2.75	7
<i>Craven Chemical Co., New Bern, N. C.—</i>			
Elite Cotton Grower	8	2	2
Duplin Tobacco Guano	8	3	3
Trent Bone and Potash	10	..	2
Neuse Truck Guano	6	6	6
Pantego Potato Guano	7	5	7
Marvel Great Crop Grower	8	2.50	3
Hanover Standard Guano	8	4	4
Gaston High Grade Fertilizer.....	8	3	3
Panama Prolific Crop Grower	8	2.50	3
Manteo Tobacco Guano	8	3	3
Wiona Guano	8	2.50	3
Genuine German Kainit .....	..	..	12
New Bern Bone and Potash	12	..	4
Jewel Acid Phosphate	14	..	..
<i>Calder Bros., Wilmington, N. C.—</i>			
Muriate of Potash .....	..	..	50
Genuine German Kainit .....	..	..	12
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Ben Hur H. G. Guano.....	10	3	3
Chickamauga H. G. Fertilizer	10	2	2
H. G. Plant Food, C. S. M.....	10	2	2
Fish Scrap Guano	10	2	2
Complete Fertilizer	8	2	2
Blood and Bone	9	2	1
Standard Corn Grower	8	2	2
Bone and Potash	10	..	2
Wheat and Corn Grower	10	..	4
13-4	13	..	4
High Grade Dissolved Bone No. 16.....	16	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
High Grade Dissolved Bone.....	14	..	..
Dissolved Bone	12	..	..
Alkaline Bone	8	..	4
Special Corn Compound.....	10	2	4
Special Wheat Compound	10	2	4
Special Vegetable Compound.....	10	2	4
Georgia Homestead Guano.....	8	2	2
<i>Contentnea Guano Co., Wilson, N. C.—</i>			
Contentnea Tobacco Grower	8	3	3
Contentnea Cotton Grower	8	3	2.50
Pick Leaf Tobacco Special	8	3.50	5
Top Notch Guano	8	2	2
Woodard's Blood and Bone Cotton Compound.....	8	2	2
Contentnea Top Dresser	3	10	5
<i>W. B. Cooper, Wilmington, N. C.—</i>			
Muriate Potash .....	..	..	50
Nitrate Soda .....	..	18	..
Kainit.....	..	..	12
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano	8	3	3
Clayton Cotton Grower	8	2	2
<i>Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—</i>			
Horne's Best Guano	8	3	3
Planters' Pride Guano	8	2.50	3
Caraleigh Top Dresser	3	10	4
Caraleigh Special Tobacco Grower.....	8	2.50	3
Pacific Tobacco and Cotton Grower.....	9	2.75	2
Eclipse Ammoniated Guano	8	2.50	2
Eli Ammoniated Guano	8	2	2
Crown Ammoniated Guano	8	2	1.50
Comet Guano	8	2	1
Horne & Son's High Grade Bone and Potash.....	11	..	5
Special Bone and Potash Mixture.....	10	..	4
Climax Dissolved Bone.....	14	..	..
Buncombe Wheat Grower	8	..	4
Electric Bone and Potash	10	..	2
Sterling High Grade Acid Phosphate.....	13	..	..
Staple Acid Phosphate	12	..	..
Dandy Acid Phosphate	10	..	..
16 Per Cent Acid Phosphate.....	16	..	..
Morris and Scarboro's Special Bone and Potash....	10	..	3
Genuine German Kainit .....	..	..	12
Nitrate of Soda.....	..	19	..
Sulphate of Potash .....	..	..	50
Muriate of Potash.....	..	..	50
Bone Meal	20	4.75	..
<i>The Coe-Mortimer Co., Charleston, S. C.—</i>			
Bone Meal	20	4.75	..
Genuine Peruvian Guano	20	4	2.75
Genuine Peruvian Guano.....	9	9	2
Kainit.....	..	..	12
Sulphate.....	..	..	48

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Muriate of Potash .....	..	..	49 & 50
Nitrate of Soda .....	..	18	..
Basic Slag. (Total)	17	..	..
<i>W. H. Camp, Petersburg, Va.—</i>			
Camp's Prepared Chemicals No. 1.....	8	3.50	7.50
Camp's Prepared Chemicals No. 3.....	8	2.75	2
Camp's Prepared Chemicals for Potatoes.....	7	7.50	10
Camp's Lion Brand.....	8	3	3
<i>Crow Fertilizer Co., Monroe, N. C.—</i>			
Crow's 14 Per Cent Acid Phosphate.....	14	..	..
Union County Special.....	8	2	2
Crow's Blood and Fish.....	8	3	3
Muriate of Potash.....	..	..	50
Kainit .....	..	..	12
<i>Dixie Guano Co., Raleigh, N. C.—</i>			
Old Plantation Superphosphate	8	2	2
Sulky Plow Brand	8	3	2
Radium.....	8	4	5
Carolina Special Ammoniated	8	3	3
Jeff Davis Special	9	2.75	2
Dixie Star Ammoniated	8	2	1
Dixie Champion for Wheat and Corn.....	10	..	1.50
Battle's Blood and Bone	8	2.50	3
Niagara Soluble Bone	8	2.50	2
<i>Etiwan Fertilizer Co., Charleston, S. C.—</i>			
Etiwan High Grade Acid Phosphate	14	..	..
Etiwan High Grade Cotton Fertilizer	8	3	3
Etiwan Special Cotton Fertilizer	8	4	4
Etiwan Dissolved Bone	13	..	..
Etiwan Soluble Bone with Potash	10	..	3
Etiwan Potash Bone	10	..	4
Etiwan Special Potash Mixture	8	..	4
Etiwan Ammoniated Fertilizer	8	2	2
Etiwan Cotton Compound	8	3	3
Etiwan Acid Phosphate with Potash.....	11	..	1
Etiwan Ammoniated Dissolved Bone.....	8.65	2	2
Etiwan Blood and Bone Guano.....	8	2.50	1
Diamond Soluble Bone.....	13	..	..
Diamond Soluble Bone with Potash.....	10	..	2
Plow Brand Ammoniated Dissolved Bone.....	8.65	2	2
Plow Brand Ammoniated Fertilizer.....	8	2	2
Plow Brand Raw Bone Superphosphate.....	8	2.50	1
Plow Brand Special Tobacco Fertilizer.....	8	4	4
Plow Brand Acid Phosphate with Potash.....	11	..	1
XX Acid Phosphate with Potash.....	10	..	2
Genuine German Kainit.....	..	..	12
<i>Eureka Fertilizer Co., Perryville, N. C.—</i>			
Alkaline Bone	10	..	2
Farmer's Favorite Bone Phosphate.....	8	2	2
5 Per Cent Alkaline	12	..	5
Camden Special	6	5	7
Potato Special	8	2.50	3
P. & P. Superphosphate	14	..	..
High Grade Trucker	8	2	10

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Farmer's Guano Co., Raleigh, N. C.—</i>			
Farmer's High Grade Acid Phosphate.....	13	..	..
16 Per Cent Acid Phosphate.....	16	..	..
State Standard Guano.....	8	2	2
Big Crop Guano.....	8	2.50	3
Century Bone and Potash Mixture.....	10	..	2
Special Bone and Potash Mixture.....	10	..	4
14 Per Cent Acid Phosphate.....	14	..	..
Golden Grade Guano.....	8	3	3
Toco Tobacco Guano.....	8	2.50	3
Bone Meal (Total)	20	4.75	..
Farmer's Top Dresser	3	10	4
<i>W. S. Farmer & Co., Baltimore, Md.—</i>			
W. S. Farmer & Co.'s Fish Mixture.....	8	2	2
Tampico.....	8	2	2
Hawk Eye	8	3	3
Kainit.....	..	..	12
Muriate of Potash .....	..	..	50
Nitrate of Soda .....	..	10	..
<i>Farmer's Cotton Oil Co., Wilson, N. C.—</i>			
Dean's Special Guano.....	8	4.50	7
Golden Gem Guano.....	8	3	3
Graves' Cotton Grower Guano.....	8	3	3
Planters' Friend Guano.....	8	2.50	3
Carolina Choice Tobacco Guano.....	8	2.50	3
Wilson High Grade Guano.....	8	2.75	2
Farmer's Special Guano.....	8	2	2
Crop King Guano.....	8	2	2
Xtra Good Bone and Potash.....	10	..	2
16 Per Cent Acid Phosphate.....	16	..	..
Bonum Acid Phosphate.....	14	..	..
Contentnea Acid Phosphate.....	13	..	..
Regal Acid Phosphate.....	12	..	..
Cotton-seed Meal .....	..	7.50	..
German Kainit .....	..	..	12
J. D. Farrar's Special Guano for Cotton and Tobacco	8	3	3
Perfect Top Dresser.....	2	10	5
Wilson Top Dresser.....	2	11	4
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Muriate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Regal Tobacco Guano.....	8	3.50	5
<i>Germofert Manufacturing Co., Charleston, S. C.—</i>			
Germofert Patent Potato Manure.....	..	5	6
Germofert Patent Cabbage Fertilizer.....	..	6	7
Germofert Patent Wheat and Grain Compound....	..	3	7
Germofert Patent Vegetable Guano.....	..	4	6
<i>W. R. Grace, New York, N. Y.—</i>			
Nitrate of Soda.....	..	18.50	..
<i>Greensboro Cotton Oil Co., Greensboro, Ala.—</i>			
Cotton-seed meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Griffith & Boyd, Baltimore, Md.—</i>			
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit.....	..	..	12
Spring Crop Grower.....	6.50	2	4.50
Growers' Favorite	8	4	4
Beef Blood and Bone.....	8	2.50	1
Ammoniated Bone Phosphate.....	8	2	2
<i>Hadley, Harris & Co., Wilson, N. C.—</i>			
Daisy Fish Mixture	8	2	2
Hadley's Boss Guano	8	2.75	2.50
Golden Weed Tobacco Guano	8	3	3.50
John Hadley's High Grade Plant Food.....	8	2	2
Bone and Potash Mixture	10	..	2
Top Dressing .....	..	9	6
<i>Home Fertilizer Chemical Co., Baltimore, Md.—</i>			
Cerealite Top Dressing.....	..	9	2.50
Boykin's Home Potato Grower.....	6	4	4
Phoenix Crop Grower.....	8	3	3
Boykin's Cereal Fertilizer.....	8	2	2
Boykin's Dissolved Animal Bone.....	12	2	..
Boykin's Alkaline Bone.....	10	..	2
Boykin's Vegetable Fertilizer.....	6	5	6
Boykin's High Grade Acid Phosphate.....	14	..	..
Boykin's Royal Potato Fertilizer.....	6	7	5
Home Fertilizer .....	..	7	7
Yancey's Formula for Yellow Leaf Tobacco.....	8	3	2
German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
<i>The Hubbard Fertilizer Co., Baltimore, Md.—</i>			
Hubbard's Trucker 7 Per Cent Royal Seal Co.....	6	7	5
Hubbard's Trucker 10 Per Cent Guano.....	4	10	4
Hubbard's 5 Per Cent Truck Guano.....	6	5	5
Hubbard's Jersey Trucker.....	8	2	10
Hubbard's Royal Ensign.....	8	3	4
Hubbard's Yellow Wrapper Guano.....	8	3	3
Hubbard's Exchange Guano.....	8	2	2
Hubbard's Standard Bone Superphosphate.....	8	2	3
Hubbard's Soluble Bone and Potash.....	10	..	2
Hubbard's Special Mixture of Bone and Potash....	10	..	4
German Kainit .....	..	..	12.40
Long's Favorite	8	2.50	3
Hubbard's H. G. Soluble Tennessee Phosphate.....	14	..	..
<i>M. P. Hubbard & Co., Baltimore, Md.—</i>			
Hubbard's Maryland Special Vegetable Grower....	7	5	5
<i>The Hampton Guano Co., Norfolk, Va.—</i>			
Dauntless Potash Mixture.....	10	..	2
Supreme Acid Phosphate 16 Per Cent.....	16	..	..
Hampton Crop Grower.....	10	..	4
Hampton Bone and Potash Mixture.....	11	..	2
Hampton Acid Phosphate.....	14	..	..
Hampton Ammoniated Superphosphate.....	8	2	1
Hampton Tobacco Guano.....	8	3	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Arlington Animal Bone Fertilizer	9	2.25	4
Alpha Crop Grower.....	8.50	2.50	2.50
Shirley Superphosphate	8	2	2
Little's Favorite Crop Grower.....	7	4	4
Reliance Truck Guano.....	7	5	5
Virginia Truck Grower.....	6	7	5
P. P. P. Princess Prolific Producer.....	8	3	3
Hampton Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
<i>Hardison Co., Wadesboro, N. C.—</i>			
Nitrate of Soda.....	..	18	..
<i>Humphreys-Godwin & Co., Memphis, Tenn.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>S. B. Harrell & Co., Norfolk, Va.—</i>			
Harrell's Champion Cotton and Peanut Grower...	8	2	2
Harrell's Truck Guano.....	6	7	5
Harrell's Acid Phosphate.....	14	..	..
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial Martin County Special Crop Grower.....	9	2.75	2
Imperial Fish and Bone.....	6	4	4
Imperial X. L. O. Cotton Guano.....	8	3	3
Imperial 5-6-7 Potato Guano.....	6	5	7
Imperial Williams' Special Potato Guano.....	6	5	5
Imperial Tobacco Guano.....	8	3	3
Imperial Sweet Potato Guano.....	6	2	6
Imperial 10 Per Cent Guano.....	5	10	2.50
Imperial 7-7-7 Potato Guano.....	7	7	7
Imperial Special 7 Per Cent Guano for Potatoes....	5	7	5
Imperial Champion Guano.....	8	2	2
Imperial Laughinghouse Special Tobacco Guano....	4	4	6
Imperial Cubanola Tobacco Guano.....	4	3	5
Imperial Cisco Soluble Guano.....	8	2	2
Imperial Lucky Strike Potato Guano.....	7	5	8
Imperial Cotton Grower.....	8	2	1.50
Imperial Peanut and Corn Guano.....	8	2	2
Imperial Standard Premium.....	8	2	1.50
Imperial High Grade Acid Phosphate.....	14	..	..
Imperial Tennessee Acid Phosphate.....	16	..	..
Imperial Bone and Potash.....	10	..	2
Imperial Genuine German Kainit.....	..	..	12
Nitrate of Soda.....	..	19	..
Muriate of Potash.....	..	..	50
Imperial Guano for Bright Tobacco.....	8	2.50	3
Imperial 17 Per Cent Acid Phosphate.....	17	..	..
Imperial High Grade Sweet Potato Guano.....	7	5	6
Tankage .....	..	13	..
<i>Wm. Krogan, Asheville, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>R. L. Kirkwood & Co., Bennettsville, S. C.—</i>			
Nitrate of Soda.....	..	18	..
<i>Lorene Cotton-seed Oil Mills, Mooresville, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Lester's Agricultural Chemical Works, Newark, N. J.—</i>			
Lester's Standard Pure Bone Superphosphate.....	9	2	2
Lester's Success Fertilizer.....	8	2	2
Lester's Ammoniated Dissolved Bone Fertilizer,...	8	2.50	2
<i>A. S. Lee & Sons Co., Richmond, Va.—</i>			
Lee's Special Corn Fertilizer.....	8	..	2
Lee's Plant Bed Fertilizer.....	8	2	2
Lee's Special Wheat Fertilizer.....	8	..	2
Lee's Prepared Agricultural Lime.....	..	..	2
Lee's High Grade Bone and Potash.....	9	..	4
<i>The Mapes Formula and Peruvian Guano Co., New York, N. Y.—</i>			
Complete Manure "A" Brand.....	10	3	2.50
Mapes' Economical Potato Manure.....	4	4	8
Mapes' Corn Manure.....	8	3	6
Mapes' Vegetable or Complete Manure for Light Soils	6	6	6
<i>D. B. Martin Co., Richmond, Va.—</i>			
Martin's 7 Per Cent Guano.....	6	7	5
Martin's Early Truck and Vegetable Grower.....	6	4	8
Martin's Claremount Vegetable Grower.....	7	3	5
Martin's Red Star Brand.....	6	5	5
Martin's Bull Head Fertilizer.....	8	3	3
Martin's Tobacco Special.....	8	3	3
Martin's Carolina Cotton Fertilizer.....	8	2	2
Martin's Old Virginia Favorite.....	8	2	2
Martin's Corn and Cereal Special.....	8	2	2
Martin's Raw Bone Meal..... (Total)	21	4.50	..
Martin's Pure Ground Bone..... (Total)	22.90	2	..
Martin's Animal Bone and Potash Compound.....	16	2	2.50
Martin's Pure Dissolved Animal Bone.....	12	2	..
Martin's Acid Phosphate.....	16	..	..
Martin Acid Phosphate.....	14	..	..
Martin's Potash and Soluble Bone.....	12	..	5
Martin Potash and Soluble Bone.....	12	..	3
Martin Potash and Soluble Bone.....	17	..	5
Martin's Potash and Soluble Bone.....	10	..	2
Pure Ground Bone..... (Total)	22.90	3	..
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
Martin's Animal Tankage (ground).....	16	6	..
Martin's Gilt-edge Potato Manure.....	3	7	10
Martin's High Grade Blood.....	..	17	..
Martin's Blood .....	..	15	..
Martin's Animal Bone Potato Manure.....	6	5	7
Blood .....	..	15	..
Blood .....	..	12	..
Blood .....	..	13	..
<i>Morgan Oil and Fertilizer Co., Red Springs, N. C.—</i>			
Cotton-seed Meal .....	..	7.50	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Thomas Meehan & Sons, Inc.—</i>			
Meehan Canada Hardwood Ashes.....	..	..	5.32
Meehan Bone Meal..... (Total)	20	4	..
<i>E. H. and J. A. Meadows, New Bern, N. C.—</i>			
Meadows' Cotton Guano.....	8	2	2
Meadows' All Crop Guano.....	8	2.50	2.50
Meadows' Roanoke Guano.....	8	2.50	3
Meadows' Gold Leaf Tobacco.....	8	3	3
Meadows' Sea Bird Guano.....	8	4	2.50
Meadows' Labos Guano.....	8	5	5
Meadows' Great Potato Guano.....	7	5	8
Meadows' Great Cabbage Guano.....	7	7	7
Meadows' 10 Per Cent Ammoniated Guano.....	6	10	2.50
Meadows' Dissolved Bone and Potash Compound....	10	..	4
Meadows' Dissolved Bone and Potash Compound....	10	..	2
Meadows' Diamond Acid Phosphate.....	14	..	..
Meadows' Genuine German Kainit.....	..	..	12
<i>The Miller Fertilizer Co., Baltimore, Md.—</i>			
Standard Phosphate.....	8	3	3
Ammoniated Dissolved Bone.....	8	2	2
Miller's Irish Potato.....	8	4	4
Tobacco King	8	3	3
High Grade Potato.....	6	5	7
Standard Potato	8	3	3
Profit	8	2	2
Potato and Vegetable Grower.....	8	2	4
No. 1 Potato and Vegetable Grower.....	8	4.50	7
Corn and Peanut Grower.....	10.50	..	2.25
S. C. Rock.....	14	..	..
Farmers' Profit	8	2	2
Cotton Queen	8	2	1
Trucker	8	5	5
Miller's 7 Per Cent.....	7	7	7
Harmony	8	2.50	3
Clinch	10	..	2
Potato Mixture	10	..	4
4 Per Cent Tobacco.....	8	4	4
Kainit .....	..	..	12
Miller's 16 Per Cent Acid Phosphate.....	16	..	..
<i>The MacMurphy Co., Charleston, S. C.—</i>			
Special 9-3-3 Guano.....	9	3	3
Special 8-3-3 Cotton and Corn Guano.....	8	3	3
Special 8-2-2 Cotton and Corn Guano.....	8	2	2
High Grade Acid Phosphate 16 Per Cent.....	16	..	..
High Grade Acid Phosphate 14 Per Cent.....	14	..	..
High Grade Acid Phosphate.....	13	..	..
Wilcox & Gibbs Co.'s Manipulated Guano.....	9	2.75	2
Nitrate of Soda .....	..	18	..
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	48
Pure German Kainit.....	..	..	12
<i>John F. McNair, Laurinburg, N. C.—</i>			
Genuine German Kainit.....	..	..	12

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Navassa Guano Co., Wilmington, N. C.—</i>			
Navassa Cotton Fertilizer.....	8	2	2
Navassa Grain Fertilizer.....	8	2	2
Navassa Cotton-seed Meal Guano.....	8	2	2
Navassa Fruit Growers' Fertilizer.....	8	2	6
Navassa Universal Fertilizer.....	8	2.50	1
Navassa Guano for Tobacco.....	8	2.50	2
Navassa Strawberry Top Dressing.....	8	2.50	4
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8	3	2
Navassa High Grade Guano.....	8	3	3
Navassa Complete Fertilizer.....	8	2	1
Navassa Blood and Meal Mixture.....	8	3	5
Navassa Carib Guano.....	8	3	10
Navassa Special Truck Guano.....	8	4	4
Navassa Creole Guano.....	6	5	7
Navassa Root Crop Fertilizer.....	7	5	7
Navassa Bone and Potash.....	8.50	..	2
Navassa Acid Phosphate with Potash.....	10	..	1
Navassa Dissolved Bone with Potash.....	10	..	2
Navassa Wheat Mixture.....	10	..	2.25
Navassa Wheat and Grass Grower.....	10	..	4
Navassa Gray Land Mixture.....	12	..	4
Navassa Special Wheat Mixture.....	12	..	4
Navassa Acid Phosphate	12	..	..
Navassa High Grade Dissolved Bone.....	13	..	..
Navassa 14 Per Cent Acid Phosphate.....	14	..	..
Navassa 16 Per Cent Acid Phosphate.....	16	..	..
Occoneechee Tobacco Guano.....	8	2	2
Harvest King Guano.....	8	2	3
Croatan Acid Phosphate.....	10	..	..
Harvey's Bone and Potash Mixture.....	8	..	3
Warlick's Mixture	8	..	2.25
Coree Tobacco Guano.....	8	4	4
Orton Guano	8	3	4
Clarendon Tobacco Guano.....	8	3	3
Mogul Guano	8	2.50	3
Ammoniated Soluble Navassa Guano.....	8	2.50	2
Muriate of Potash.....	..	..	48
Sulphate of Potash.....	..	..	50
Nitrate of Soda.....	..	18	..
<i>N. C. Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8	2.75	2
<i>N. C. Cotton Oil Co., Wilmington, N. C.—</i>			
Wilmington Truck Grower	8	4	4
Wilmington High Grade	8	3	3
Wilmington Cotton Grower	8	2	2
Wilmington Special 8-2-2.....	8	2	2
Wilmington Standard	8	3	2.50
Carter's Lifter	8	3	3
<i>N. C. Cotton Oil Co., Henderson, N. C.—</i>			
Unedit Tobacco Fertilizer.....	9	3	3
Henderson Tobacco Fertilizer	9	3	3
Franklin Tobacco Fertilizer	9	3	3
Unedit Cotton Grower	8	2	2
Henderson Cotton Grower	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Franklin Cotton Grower.....	8	2	2
Vance Cotton Grower.....	8	2	2
Pride of Vance Tobacco Fertilizer.....	9	3	3

*New Bern Cotton Oil and Fertilizer Mills,
New Bern, N. C.—*

Pamlico Electric Top Dresser.....	5	10	2.50
Dunn's Standard Truck Grower.....	7	7	7
Ives' Irish Potato Guano.....	7	5	7
Craven Bright Tobacco Guano.....	8	3	3
Lenoir Bright Leaf Tobacco Grower.....	8	3	3
Craven Cotton Guano.....	8	2	2
Pitt's Prolific Golden Tobacco Guano.....	8	3	3
Foy's High Grade Fertilizer.....	8	3	3
Onslow Farmers' Reliance Guano.....	8	2.50	3
Jones County Premium Crop Grower.....	8	2.50	3
Greene County Standard Fertilizer.....	8	2	2
Carteret Bone and Potash.....	10	..	2
14 Per Cent Acid Phosphate.....	14	..	..
Pot. Neck Tobacco Guano.....	8	4	4
High Grade Fertilizer.....	8	3	3
Bogue Fish Scrap.....	4	9	..
Cotton-seed Meal.....	..	7.50	..
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	48
Sulphate of Ammonia.....	..	25	..
Nitrate of Soda.....	..	19	..
Sulphate of Potash.....	..	..	50
Oriole Tobacco Grower.....	8	4	4

Norfolk Fertilizer Co., Norfolk, Va.—

Oriano Tobacco Guano.....	8	3	3
Oriano Cotton Guano.....	8	2	2
Oriano 3-8-3 for Cotton.....	8	3	3
Oriano Crop Grower.....	8	3	3
Oriano C. S. M. Special.....	9	2.75	2
Oriano Bone and Potash.....	10	..	2
Oriano 14 Per Cent Acid Phosphate.....	14	..	..
Oriano 16 Per Cent Acid Phosphate.....	16	..	..
Genuine German Kainit.....	..	..	12

G. Ober & Sons Co., Baltimore, Md.—

Ober's Dissolved Bone Phosphate.....	14	..	..
Ober's Dissolved Bone Phosphate and Potash.....	10	..	2
Ober's Acid Phosphate with Potash.....	8	..	4
Ober's Complete Fertilizer.....	6	5	6
Ober's Special Compound for Tobacco.....	8	3	3
Ober's Standard Tobacco Fertilizer.....	8	2	2
Ober's Special High Grade Fertilizer.....	9	3	3
Ober's Special Ammoniated Dissolved Bone.....	9	2	2
Ober's Special Cotton Compound.....	8	2	2
Kainit.....	..	..	12
Ober's Nitrate of Soda.....	..	18	..
Ober's Muriate of Potash.....	..	..	48
Ober's High Grade Acid Phosphate.....	16	..	..
Cooper's Pungo Guano.....	8	2.50	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>The Pocomoke Guano Co., Norfolk, Va.—</i>			
Superb Acid Phosphate 16 Per Cent.....	16	..	..
10-2 Potash Mixture.....	10	..	2
Pocomoke Bone and Potash Mixture.....	10	..	4
Pocomoke Superphosphate.....	8.50	2	2
Cinco Tobacco Guano.....	8.50	2.50	2.50
Monarch Tobacco Grower.....	8	3	3
Monticello Animal Bone Fertilizer.....	9	2.25	4
Crescent Complete Compound.....	8	2	3
L. P. H. Premium.....	8	2	2
Hornthal Tobacco Guano.....	8	2	3
Electric Crop Grower.....	8.50	2	2
Peerless Acid Phosphate.....	14	..	..
Pamlico Superphosphate.....	8	2	2
Alkali Bone	11	..	2
Harvey's High Grade Monarch.....	8	3	3
Faultless Ammoniated Superphosphate.....	7	4	4
Seaboard Popular Trucker.....	6	7	5
Standard Truck Guano.....	7	5	5
Freeman's 7 Per Cent Irish Potato Grower.....	6	7	5
Coast Line	5	10	3
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Pure Ground Bone..... (Total)	20	4.50	..
Nitrate of Soda.....	..	19	..
Faultless Ammoniated Superphosphate.....	7	4	4
Garrett's Grape Grower	4	8	10

Pacific Guano Co., Boston, Mass., and Charleston, S. C.—

Soluble Pacific Guano	8.50	2	2
Pacific Special High Grade Fertilizer.....	8	3	3
Pacific Acid Phosphate.....	12	..	..

Pocahontas Guano Co., Lynchburg, Va.—

Pocahontas Special Tobacco Fertilizer.....	9	3	3
Standard Tobacco Guano (Old Chief Brand).....	9	2	2
H. G. 4 Per Cent Tobacco Compound (Mohawk King).....	9	2.25	4
Spot Cash Tobacco Compound.....	8	2.50	3
Yellow Tobacco Special.....	9	2	2
Wabash Wheat Mixture.....	10	..	4
Cherokee Grain Special.....	8	..	4
Imperial Dissolved S. C. Phosphate.....	14	..	..
Farmers' Favorite (Apex Brand).....	8	3	3
Cherokee Cotton Grower.....	9	2	2
Black Hawk Brand.....	8	2.50	2
Red Bear Special.....	8	2.50	3
Indian Truck Grower.....	8	4	4
Big Joe Brand.....	8	2	1
Carrington's Superior Grain Compound.....	10	..	2
Carrington's Banner Brand Guano.....	8	2	2
Carrington's S. C. Phosphate (Waukesha Brand)...	16	..	..
Carrington's Superior Grain Compound No. 3.....	10	..	3
Carrington's Special Truck (Eagle Mt. Brand))....	8	2.50	6
Pure Raw Bone Meal..... (Total)	22	4.50	..

Patapsco Guano Co., Baltimore, Md.—

Patapsco Special Tobacco Mixture.....	8	2.50	3
Unicorn Guano	8	2.50	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash
Pilot Guano Special 4 Per Cent.....	10	2.50	4
Money Maker Guano.....	7	4.50	6
Patapsco Guano	9.25	2.50	2
Patapsco Guano for Tobacco.....	9.25	2.50	2
Patapsco Tobacco Fertilizer.....	9	3	3
Patapsco Trucker for Early Vegetables.....	7	5	5
Patapsco Crop Dresser.....	4	4	4
Patapsco Potato Guano.....	6	5	7
Patapsco 7-7-7 Truck Guano.....	7	7	7
Patapsco 10-4 Potash Mixture.....	10	..	4
Patapsco High Grade Bone and Potash.....	11	..	5
Patapsco Soluble Bone and Potash.....	10	..	2
Patapsco Dissolved S. C. Phosphate.....	14	..	..
Choctaw Guano	8	3	3
Planters' Favorite	8	2	2
Sea Gull Ammoniated Guano.....	8	2	2
Baltimore Soluble Phosphate.....	11	..	2
Florida Soluble Phosphate.....	16	..	..
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..
Ground Fish .....	..	10	..
<i>Planters Fertilizer and Phosphate Co., Charleston, S. C.—</i>			
Planters' Blood, Bone and Potash.	8	2.50	1
Planters' High Grade Acid Phosphate.....	14	..	..
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	18	..
Planters' Special Truck.....	8	3	10
<i>Z. V. Pate, Laurel Hill, N. C.—</i>			
Nitrate of Soda .....	..	18	..
<i>Parker & Hunt, Oxford, N. C.—</i>			
Parker & Hunt's Special	8	2	2
<i>Pitt County Oil Co., Winterville, N. C.—</i>			
Cotton-Seed Meal .....	..	7.50	..
<i>Peoples Cotton Oil Co., Selma, Ala.—</i>			
Cotton-seed Meal .....	..	7.50	..
<i>Powhatan Chemical Co., Richmond, Va.—</i>			
Powhatan Trucker	7	6	5
North State Special	8	4	4
P. C. Co.'s Hustler.....	8	3	3
Economic Cotton Grower	9	2.75	2
White Leaf Tobacco Fertilizer	8	2.50	3
King Brand Fertilizer	8	2.50	3
Magic Tobacco Grower	8	2	2
Magic Special Fertilizer	8	2	2
Magic Cotton Grower	8	2	2
Magic Mixture	8	2	1
Guilford's Special Tobacco Fertilizer.....	9	3	6
Magic Bone and Potash Mixture	10	..	4
Powhatan Bone and Potash Mixture.....	8	..	4
Magic Grain and Grass Grower.....	8	..	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Magic Peanut Grower	8	..	4
Bone and Potash Mixture	10	..	2
Dixie Grain and Grass Grower	8	..	2
Magic Dissolved Bone Phosphate	16	..	..
Uneeda Acid Phosphate	15	..	..
High Grade Acid Phosphate.....	14	..	..
Powhatan Acid Phosphate	13	..	..
Virginia Dissolved Bone	12	..	..
Magic S. C. Phosphate	10	..	..
Bone Meal (Total)	25	3	..
Pure Raw Bone Meal (Total)	20	4	..
Pure German Kainit .....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..

Piedmont-Mt. Airy Guano Co., Baltimore, Md.—

Privott's Standard Guano.....	8	2.50	3
Privott's Special for Potatoes and Vegetables.....	8	2	6
Piedmont High Grade Ammoniated Bone and Potash.....	8	3	3
Piedmont Farmers' High Grade Bone and Potash...	10	..	2
Piedmont Special Farmers' Tobacco Guano	8	3	4
Piedmont Guano for Tobacco	8	2.50	3
Piedmont High Grade S. C. Bone Phosphate.....	14	..	..
Piedmont Special for Cotton, Corn and Peanuts....	8	2	2
Piedmont Early Vegetable Manure	6	5	7
Piedmont Cultivator Brand	8	2	2
Piedmont Bone and Peruvian Mixture	8	2	2
Piedmont Special Truck Fertilizer	6	7	5
Piedmont Essential Tobacco Compound	9	2	2
Piedmont Soluble Bone and Potash	8	..	2
Privott's 3-8-4 Guano	8	3	4
Levering's Potash Bone.....	10	..	4
Levering's Reliable Tobacco Guano	8	3	3
Genuine German Kainit .....	..	..	12
Nitrate of Soda .....	..	18.50	..
Muriate of Potash.....	..	..	50
Stowe Boss Select	8	4	4
Piedmont Vegetable Compounds.....	6	4	8
Piedmont Farmers' Standard	9	2	2

Parson & Hall, Wadesboro, N. C.—

German Kainit	11
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Pine Level Oil Mills, Pine Level, N. C.—

Hale's Special for Tobacco.....	8	3	4
Pine Level High Grade Guano.....	8	3	3

The Quinnpiac Co., New York, N. Y., Charleston, S. C.—

Quinnpiac Pine Island Ammoniated Superphosphate	9	2.25	1
Quinnpiac Acid Phosphate.....	13	..	..

F. S. Royster Guano Co., Norfolk, Va.—

Marlboro H. G. Cotton Grower	8	3	3
Bonanza Tobacco Guano	8	3	3
Farmers' Bone Fertilizer	8	2	2

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Special Compound	8	2	1
Caledonia Compound	8	2	1
Arrow Brand Guano	8	2.50	1
Royster's Meal Mixture	9	2.75	2
Orinoco Tobacco Guano.....	8	2.50	3
Special Tobacco Compound	8	2.50	2
Cobb's High Grade for Tobacco	8	5	6
Royster's Special 10 Per Cent Truck Guano.....	5	10	3
Royster's Early Truck Guano	7	5	8
Royster's Special 7 Per Cent Truck Guano	7	7	7
Trucker's Delight	8	4	4
Royal Potato Guano	7	5	5
Royal Special Potato Guano	7	5	7
Ballentine's Potato Guano	6	7	7
Royster's Special Sweet Potato Guano	8	3	3
Tomlinson's Special	9	3	5
Royster's Special 4-8-3	8	4	3
Royster's Special Wheat Fertilizer	8	2	2
Royster's Best Guano	8	4.50	7
Royster's Complete Guano	8	2	2
Royster's Special	8	4	3
Humphrey's Special for Tobacco.....	6	3.10	3.20
Harvey's Cabbage Guano	5	8	3
Royster's 4-9-5 Special	9	4	5
Williams' Special Guano	8	2.50	5
Magie Top Dresser .....	..	9	2.50
Royster's Peanut Special	7	..	5
Royster's Bone and Potash Mixture	10	..	2
Royster's 8-2 Bone and Potash Mixture.....	8	..	2
Royster's 10-4 Bone and Potash Mixture.....	10	..	4
Royster's 8-4 Bone and Potash Mixture.....	8	..	4
Royster's 8-2.25 Bone and Potash Mixture.....	8	..	2.25
Royster's Bone and Potash for Grain.....	10	..	3
Royster's H. G. Dissolved Bone.....	13	..	..
Royster's 14 Per Cent Acid Phosphate.....	14	..	..
Royster's XX Acid Phosphate.....	12	..	..
Royster's H. G. 16 Per Cent Acid Phosphate.....	16	..	..
Genuine German Kainit .....	..	..	12
Muriate of Potash .....	..	..	48
Sulphate of Potash .....	..	..	50
Nitrate of Soda .....	..	19	..
Cotton-seed Meal .....	..	7.50	..
Eagle's Special Tobacco Guano.....	8	3	5
Royster's Bone and Potash Mixture.....	11	..	5
Royster's Potato Guano	5	6	7
Royster's 2-6-5 Special	6	2	5

Read Phosphate Co., Charleston, S. C.—

Read's Special Potash Mixture.....	8	..	4
Read's High Grade Tobacco Leaf	8	3	3
Read's Bone and Potash	10	..	4
Read's Cotton Flower	8	2.50	1
Read's Blood and Bone Fertilizer No. 1.....	8	2	2
Read's Soluble Fish Guano	8	2	2
Read's High Grade Manipulated.....	9	2	3
Read's High Grade Dissolved Bone	14	..	..
Read's High Grade Cotton Grower	8	3	3
Read's High Grade Acid Phosphate	13	..	..
Read's Alkaline Bone.....	10	..	2
Genuine German Kainit .....	..	..	12

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Richmond Guano Co., Richmond, Va.—</i>			
Perfection Special	8	4	4
Southern Trucker	8	5	5
Special High Grade for Truck.....	7	6	5
10 Per Cent Cabbage Guano.....	6	10	2
Gilt-edge Fertilizer	8	3	3
Carolina Cotton Grower	9	2.75	2
Carolina Bright Special Tobacco Fertilizer.....	8	2.75	2.50
Tip Top Fertilizer	8	2.50	3
Special Premium Brand for Tobacco.....	8	2.25	2.25
Special Premium Brand for Plants	8	2.25	2.25
Carolina Bright for Cotton	8	2.50	1.50
Premium Tobacco Fertilizer	8	2	2
Premium Brand Fertilizer	8	2	2
Bone Mixture	8	2	1
Clark's Special Formula	7	6	6
Carter's Special Tobacco Fertilizer	4	3	6
Saunders' Special Formula for Bright Tobacco....	9	3.50	5
Burton's Special Tobacco Fertilizer	9	2.50	3
Premium Bone and Potash Mixture.....	13	..	3
Rex Bone and Potash Mixture	10	..	4
Tip-Top Bone and Potash Mixture.....	8	..	4
Winter Grain and Grass Grower	8	..	4
Premium Peanut Grower	8	..	4
Bone and Potash Mixture.....	10	..	2
Premium Grain and Grass Grower	8	..	2
Rex Dissolved Bone Phosphate	16	..	2
Regal Acid Phosphate.....	15	..	..
High Grade Acid Phosphate	14	..	..
High Grade Wheat and Grass Fertilizer.....	14	..	..
Premium Dissolved Bone	13	..	..
Dissolved S. C. Phosphate	12	..	..
Old Homestead Dissolved Bone	10	..	..
Edgecombe Cotton Grower	8	2	2
Hunter & Dunn's Dissolved Bone.....	13	..	..
Hunter & Dunn's Ammoniated Fertilizer.....	8	2	2
Hunter & Dunn's Special Ammoniated Fertilizer....	9	3	2.25
Bone Meal	25	3	..
Pure Raw Bone Meal	20	4	..
Pure German Kainit .....	..	..	12
Muriate of Potash .....	..	..	50
Sulphate of Potash .....	..	..	48
Sulphate of Ammonia .....	..	24	..
Nitrate of Soda .....	..	19	..
Beeson's Special Fertilizer.....	8	2	6
<i>Reidsville Fertilizer Co., Reidsville, N. C.—</i>			
Banner Fertilizer	8	2	1
Champion Guano	8	2	2
Lion Brand Fertilizer	9	3	6
Broad Leaf Tobacco Guano.....	9	2.25	2.50
Royal Fertilizer	8	3	3
Bone and Potash 10-4.....	10	..	4
Bone and Potash 8-2.....	8	..	2
<i>Rasin-Monumental Co., Baltimore, Md.—</i>			
Rasin Bone and Potash	10	..	2
Rasin Special Bone and Potash.....	10	..	5

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Rasin Empire Guano	8	2	2
Rasin Dixie Guano	8	2	1
Rasin Gold Standard Guano.....	8	3	3
Rasin 13 Per Cent Acid Phosphate.....	13	..	..
Rasin 16 Per Cent Acid Phosphate.....	16	..	..
Rasin Acid Phosphate	14	..	..

J. H. Roberson & Co., Robersonville, N. C.—

Roberson's Cotton Grower	9	2.75	2
Roberson's Potato Grower	6	7	5
Roberson's Special Potato Grower.....	7	7	7
Roberson's Bright Leaf Grower	8	2.50	3
Roberson's High Grade Acid Phosphate	14	..	..
Genuine German Kainit .....	..	..	12

Swift Fertilizer Works, Atlanta, Ga.—

Swift's Blood, Bone, and Potash H. G. Guano.....	9.25	4	7
Swift's Corn and Cotton Grower H. G. Guano.....	10	3	3
Special High Grade Guano	9.25	5	3
Swift's Monarch High Grade Guano.....	8	4	4
Swift's Cotton King High Grade Guano.....	9	3	2
Swift's Farmers' Home High Grade Guano.....	9	2	3
Swift's Pioneer High Grade Tobacco Grower.....	8	2	4
Swift's Golden Harvest Standard Grade Guano....	8	2	2
Swift's Eagle High Grade Guano.....	10	2	2
Swift's Red Steer Standard Grade Guano	8	2	2
Swift's Cotton Plant Standard Grade Guano.....	8	2	1
Swift's Rivalist High Grade Guano.....	8	3	3
Swift's Special High Grade Phosphate and Potash..	12	..	6
Swift's Atlanta High Grade Phosphate and Potash..	12	..	4
Swift's Farmers' Home H. G. Phosphate and Potash	10	..	4
Swift's Plantation Standard Grade Phosphate and Potash	8	..	4
Swift's Wheat Grower Standard Grade Phosphate and Potash	10	..	2
Swift's Field and Farm Standard Grade Phosphate and Potash	10	..	2
Swift's Special High Grade Acid Phosphate.....	16	..	..
Swift's Cultivator High Grade Acid Phosphate.....	14	..	..
Swift's Harrow High Grade Acid Phosphate.....	13	..	..
Swift's Chattahoochee Standard Grade Acid Phos- phate	12	..	..
Swift's German Kainit.....	..	..	12
Swift's Pure Nitrate of Soda.....	..	18	..
Swift's Muriate of Potash.....	..	..	50

Swift & Co., Chicago, Ill.—

Swift's Pure Raw Bone Meal.....(Total)	23	4	..
Swift's No. 1 Ground Tankage.....	6	10	..
Swift's Pure Bone Meal.....	25	3	..
Swift's Ground Dried Blood.....	..	16	..

South Atlantic Oil Co., Wadesboro, N. C.—

Cotton-seed Meal	7.50	..
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The Southern Exchange Co., Maxton, N. C.—

The Coon Guano.....	8	2	2
The Racer Guano.....	8	2	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
The Walnut Fertilizer.....	8.50	2.50	2.50
Juicy Fruit Fertilizer.....	9	2.25	4
R. M. C. Special Crop Grower.....	8	3	3
Correct Cotton Compound.....	8	3	3
Jack's Best Fertilizer.....	8	3	3
Bull of the Woods Fertilizer.....	8	3	4
That 'Big Stick Guano.....	8	3	4
Two Fours Guano.....	7	4	4
S. E. C. Acid Phosphate.....	16	..	..
Acid Phosphate.....	14	..	..
McKimmon's Special Truck Formula.....	8	5	7
Melon Grower.....	8	5	7
S. E. C. Bone and Potash Mixture.....	10	..	4
Bone and Potash Mixture.....	10	..	2
Genuine German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Nitrate of Soda.....	..	19	..

*Southern Cotton Oil Co., Charlotte, Concord, Davidson,
Gastonia, Shelby, Monroe, N. C.—*

Peacock	8	3	3
Conqueror	8	4	4
Red Bull	8	2.50	2
Moon	8	3	3
King Bee	8.65	2	2
Magnolia	8.65	2	2
Gloria	8	2	2
First Call	8	2.50	1
Gold Seal	14	..	..
Sunrise	8	2.50	1
Silver King	13	..	..
Conqueror Bone and Potash.....	10	..	4
Magnolia Bone and Potash.....	10	..	2
Genuine German Kainit.....	..	..	12

*Southern Cotton Oil Co., Goldsboro, Fayetteville, Wilson
and Rocky Mount, N. C.—*

Best & Thompson's Special Cotton Grower.....	9	2.75	2
Southern Cotton Oil Co.'s High Grade.....	8	2.75	2.50
Edgerton's Old Reliable	8	3	3
Rocky Mount Oil Mill's Special Cotton Grower....	8	3	3
Rocky Mount Oil Mill's Standard	8	2	2
Rocky Mount Oil Mill's Special Cotton Grower....	8	3	3
Goldsboro Oil Mill's High Grade.....	8	2.75	2
Goldsboro Oil Mill's Special Cotton Grower.....	8	3	3
Goldsboro Oil Mill's Standard	8	2	2

Southern Chemical Co., Inc., Roanoke, Va.—

Our Favorite	8	2	2
Pride of Virginia.....	8	2	3
Farmers' Joy	8	2	4

Tuscarora Fertilizer Co., Baltimore, Md.—

13 Per Cent Acid Phosphate.....	13	..	..
Acid Phosphate	14	..	..
16 Per Cent Acid Phosphate.....	16	..	..
17 Per Cent Acid Phosphate.....	17	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Bone and Potash.....	10	..	2
Alkaline	10	..	5
Manure Substitute	6	4	4
Big Four	7	2	4
Standard	8	2	2
Fruit and Potato.....	8	2	10
King Cotton	8	2.50	1
King Cotton No. 2.....	8	2.50	2
Champion	8	2.50	2.50
Berry King	8	2.50	4
Tobacco Special	8	3	3
Cotton Special	8	3	3
Special Trucker	8	4	4
Tuscarora Trucker	8	5	7
Animal Bone	(Total) 24	3	..
Raw Bone Meal.....	(Total) 22	4.50	..
Sulphate of Potash .....	..	..	50
Nitrate of Soda.....	..	18	..
Muriate of Potash.....	..	..	48
Kainit .....	..	..	12

R. L. Upshur, Norfolk, Va.—

Upshur's Fish Bone and Potash Guano.....	8	2	4
Upshur's 5 Per Cent Guano.....	5	5	5
Upshur's 3-8-3 Cotton Guano.....	8	3	3
Upshur's Peanut Guano.....	8	2	2
Upshur's G. G. and C. (Grain, Grass and Cotton) Guano	8	2	2
Upshur's Special Truck Guano.....	7	5	8
Upshur's 7 Per Cent Special Potato Guano.....	5	7	5
Upshur's 7 Per Cent Irish Potato Guano.....	6	7	5
Upshur's F. C. (Farmers' Challenge) Guano.....	6	7	6
Upshur's F. F. (Farmers' Favorite) Guano.....	7	5	6
Premo Cotton Guano.....	8	2	1.50
Upshur's Bone and Potash Guano.....	10	..	2
Upshur's High Grade Acid Phosphate.....	14	..	..
Upshur's High Grade Guano.....	8	3	3
Cotton-seed Meal Mixture.....	9	2.75	2
Genuine German Kainit.....	..	..	12

Union Guano Co., Winston, N. C.—

Union Potato Manure.....	8	2	1
Union Approved Crop Grower.....	8.65	2	2
Union Truck Guano.....	7	4	5
Union Perfect Cotton Grower.....	9	2.75	2
Union Mule Brand Guano.....	10	2	2
Union Waterfowl Guano.....	8	2.50	3
Union Homestead Guano.....	8	3	3
Union Standard Tobacco Grower.....	8	2.50	2
Union Premium Guano.....	8	4	4
Union Vegetable Compound.....	7	5	8
Union 10-4 Bone and Potash.....	10	..	4
Union Wheat Mixture.....	8	..	4
Union Bone and Potash.....	10	..	2
Union 10-6 Bone and Potash.....	10	..	6
Union 10-5 Bone and Potash.....	10	..	5
Union 12-3 Bone and Potash.....	12	..	3
Union 12-4 Bone and Potash.....	12	..	4

Name and Address of Manufacturer and Name of Brand.	Avail Phos. Acid.	Am- monia.	Potash.
Union 12-5 Bone and Potash.....	12	..	5
Union 12-6 Bone and Potash.....	12	..	6
Union 16 Per Cent Acid Phosphate.....	16	..	..
Union High Grade Acid Phosphate.....	14	..	..
Union Dissolved Bone.....	13	..	..
Union 12 Per Cent Acid Phosphate.....	12	..	..
Union 10 Per Cent Acid Phosphate.....	10	..	..
Giant Phosphate and Potash.....	10	..	3
Sunrise Soluble Bone and Potash.....	8	..	2.25
Liberty Bell Crop Grower	10	..	1.50
Rockingham Bone and Potash.....	8.50	..	2
Roseboro's Special Potash Mixture.....	12	..	6
Old Honesty Guano.....	8	2	2
Victoria High Grade Tobacco Guano.....	8	3	3
Vulcan Ammoniated Guano.....	8	2.50	1
Quaker Grain Mixture.....	10	..	4
Q. and Q. (Quantity and Quality) Guano.....	8	2	1
Genuine German Kainit.....	..	..	12
Murray's Potash Mixture.....	8	..	2.25
Murray's Special Crop Grower.....	8	2	2
Cotton-seed Meal .....	..	7.50	..
Union Special Formula for Cotton.....	10	3	3
Union Complete Cotton Mixture.....	9	2	3

Venable Fertilizer Co., Richmond, Va.—

Venable's 10 Per Cent Trucker.....	6	10	2
Venable's 6-6-6 Manure.....	6	6	6
Venable's 5 Per Cent Trucker.....	8	5	5
Venable's 4 Per Cent Trucker.....	8	4	4
Venable's Ideal Manure.....	8	2	5
Venable's Roanoke Special.....	8	2.50	3
Venable's Dissolved Bone Phosphate.....	13	..	..
Venable's S. C. Bone.....	10	..	..
Venable's B. B. P. Manure.....	8	2	1
Venable's Alliance Bone and Potash Mixture.....	8	..	4
Venable's Peanut Grower.....	8	..	4
Venable's Grain and Grass Grower.....	8	..	2
Venable's Alliance Acid Phosphate.....	14	..	..
Planters' Bone Fertilizer.....	8	2	2
Bone and Potash Mixture.....	10	..	2
High Grade Bone and Potash Mixture.....	10	..	4
Pure Raw Bone Meal..... (Total)	20	4	..
Bone Meal	25	3	..
Pure German Kainit.....	..	..	12
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	48
Nitrate of Soda.....	..	19	..
Venable's Cotton Grower.....	8	2.50	3
Venable's Roanoke Mixture.....	9	2.75	2

Virginia-Carolina Chemical Co., Richmond, Va.—

V. C. C. Co.'s Solid South.....	8	..	2.25
V. C. C. Co.'s 14 Per Cent Acid Phosphate.....	14	..	..
V. C. C. Co.'s 16 Per Cent Acid Phosphate.....	16	..	..
V. C. C. Co.'s Standard Bone and Potash.....	10	..	5
V. C. C. Co.'s Special Crop Grower.....	12	..	3
V. C. C. Co.'s Formula 44.....	7	3.10	3.20
V. C. C. Co.'s Special Truck Guano.....	6	5	7

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
V. C. C. Co.'s Special.....	8	4	4
V. C. C. Co.'s Special Potash Mixture.....	10	..	4
V. C. C. Co.'s High Grade Tobacco Fertilizer.....	8	3	10
V. C. C. Co.'s Invincible High Grade Fertilizer.....	6	5	7
V. C. C. Co.'s Lion High Grade Tobacco Fertilizer..	8	3	4
V. C. C. Co.'s Great Texas Cotton Grower Soluble Guano	9	3	4
Cock's Soluble High Grade Animal Bone.....	9	2.25	3
Truck Crop Fertilizer.....	7	5	7
Cotton Grower	9	2.75	2
Battle's Crop Grower.....	12	..	3
3 Per Cent Special C. S. M. Guano No. 3.....	8	3	2
Sludge Acid Phosphate.....	14	..	..
Delta C. S. M.	8	2.75	2.50
Winston Special for Cotton C. S. M.....	8	2	2
Diamond Dust C. S. M.	8	2	2
Admiral	8	3	2.50
Blue Star C. S. M.....	8	2.50	3
Good Luck C. S. M.....	8	3	2.50
North State Guano C. S. M.....	8	2	1
Plant Food	8	2	2
Prolific Cotton Grower C. S. M.....	9	2.75	2
Split Silk C. S. M.....	8	3	2.50
Superlative Guano C. S. M.....	8	2.50	3
Farmers' Friend Favorite Fertilizer Special.....	8.50	2	2
White Stem C. S. M.....	9	2.75	2
Special High Grade Tobacco Fertilizer C. S. M.....	8	3	3
Wilson Standard C. S. M.....	8	2	2
Adams' Special	8	3	3
Ajax C. S. M.....	8	2	2
Royal Crown	8	2.75	2
Farmers' Favorite Fertilizer C. S. M.....	8	2	2
Atlas Guano C. S. M.....	8	3	2.50
Blake's Best	8	3	3
Orange Grove	8	2.75	2.50
Genuine German Kainit.....	..	..	12
Cotton-seed Meal .....	..	7.50	..
Nitrate of Soda.....	..	19	..
Fish Scrap .....	..	10	..
Raw Bone Meal..... (Total)	20	4	..
Sulphate of Ammonia.....	..	25	..
Muriate of Potash.....	..	..	50
Sulphate of Potash.....	..	..	50
Manure Salts .....	..	..	50
Carr's 8-4-4 Crop Grower.....	8	4	4
Allison & Addison's Rockett's Acid Phosphate.....	10	..	..
Allison & Addison's Standard Acid Phosphate.....	12	..	..
Allison & Addison's I. X. L. Acid Phosphate.....	13	..	..
Allison & Addison's Fulton Acid Phosphate.....	14	..	2.25
Allison & Addison's McGavock's Spl. Potash Mixture,	8	..	..
Allison & Addison's B. P. Potash Mixture.....	10	..	2
Allison & Addison's Old Hickory Guano.....	8	2	2
Allison & Addison's A A.....	8	3	3
Allison & Addison's Anchor Brand Fertilizer.....	8	2	2
Allison & Addison's Anchor Brand Tobacco Fertilizer,	8.50	2.75	2
Allison & Addison's Star Brand Spl. Tobacco Manure	9	2.75	2
Allison & Addison's Star Brand Guano.....	8	2	1
Allison & Addison's Star Brand Vegetable Guano...	8	4.50	4

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Atlantic & Va. Fert. Co.'s Our Acid Phosphate....	12	..	..
Atlantic & Va. Fert. Co.'s Valley of Va. Phosphate..	14	..	..
Atlantic & Va. Fert. Co.'s Eureka Acid Phosphate..	10	..	..
Atlantic & Va. Fert. Co.'s Crenshaw's Acid Phosphate	13	..	..
Atlantic & Va. Fert. Co.'s Eureka Bone and Potash Compound	10	..	2
Atlantic & Va. Fert. Co.'s Carolina Truckers'.....	7	7	7
Atlantic & Va. Fert. Co.'s Orient Spl. for Tobacco...	8	2	2
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone,	8	2	2
Atlantic & Va. Fert. Co.'s Virginia Truckers'.....	8	5	5
Atlantic & Va. Fert. Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9	2.50	2
Atlantic & Va. Fert. Co.'s Orient Complete Manure..	8	2	1
Charlotte Oil & Fert. Co.'s Catawba Acid Phosphate,	10	..	..
Charlotte Oil & Fert. Co.'s Charlotte Dissolved Bone,	12	..	..
Charlotte Oil & Fert. Co.'s Charlotte 15 Per Cent Acid Phosphate	15	..	..
Charlotte Oil & Fert. Co.'s Charlotte Acid Phosphate,	13	..	..
Charlotte Oil & Fert. Co.'s Charlotte Ten-Two Bone and Potash	10	..	2
Charlotte Oil & Fert. Co.'s Oliver's Perfect Wheat Grower	11	3	4
Charlotte Oil & Fert. Co.'s McCrary's Diamond Bone and Potash	8	..	3
Charlotte Oil & Fert. Co.'s Catawba Guano B. G....	8	2	1
Charlotte Oil & Fert. Co.'s Queen of the Harvest C. S. M.....	8	2	1
Charlotte Oil & Fert. Co.'s Special 3 Per Cent Guano C. S. M.....	8	3	2
Charlotte Oil & Fert. Co.'s High Grade Special Tobacco Fertilizer	9	2.50	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Bone B. G.....	8	2.50	1.50
Charlotte Oil & Fert. Co.'s Groom's Special Tobacco Fertilizer	8	3	3
Charlotte Oil & Fert. Co.'s King Cotton Grower.....	8	2	2
Charlotte Oil & Fert. Co.'s The Leader B. G.....	8	2	2
Charlotte Oil & Fert. Co.'s Charlotte Ammoniated Guano B. G.....	8	2.50	1.50
Davie & Whittle's Owl Brand Dissolved Bone.....	12	..	..
Davie & Whittle's Owl Brand Acid Phosphate.....	10	..	..
Davie & Whittle's Owl Brand H. G. Acid Phosphate,	13	..	..
Davie & Whittle's Owl Brand H. G. Dissolved Bone..	14	..	..
Davie & Whittle's Owl Brand Acid Phosphate with Potash	10	..	2
Davie & Whittle's Owl Brand Guano.....	8	2	2
Davie & Whittle's Owl Brand Guano No. 2.....	8	2	1
Davie & Whittle's Owl Brand Truck Guano.....	8	6	5
Davie & Whittle's Owl Brand Special Tobacco Guano,	9	2.50	2
Davie & Whittle's Owl Brand Guano for Tobacco...	8	3	3
Davie & Whittle's Owl Brand Vinco Guano.....	8	2	1
Durham Fert. Co.'s Durham Acid Phosphate.....	10	..	..
Durham Fert. Co.'s Durham H. G. Acid Phosphate..	13	..	..
Durham Fert. Co.'s Durham Bone and Potash Mixture	10	..	2
Durham Fert. Co.'s Durham Ammoniated Fertilizer,	8	2	1
Durham Fert. Co.'s N. C. Farmers' Alliance Official Acid Phosphate	13	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Durham Fert. Co.'s Blacksburg Dissolved Bone.....	13	..	..
Durham Fert. Co.'s Raw Bone Superphosphate for Tobacco	8	2.50	2
Durham Fert. Co.'s Genuine Bone and Peruvian Guano for Tobacco.....	8	2	2
Durham Fert. Co.'s Raw Bone Superphosphate.....	8	2.50	1.50
Durham Fert. Co.'s Gold Medal Brand Guano.....	8	3	3
Durham Fert. Co.'s Genuine Bone and Peruvian Guano	8	2	2
Durham Fert. Co.'s N. C. Farmers' Alliance Official Guano	8	2.50	3
Durham Fert. Co.'s Golden Leaf Bright Tobacco Guano	8	3	3
Durham Fert. Co.'s Spl. Plant and Truck Fertilizer.	8	5	3
Durham Fert. Co.'s Progressive Farmer Guano.....	8	2	1
Durham Fert. Co.'s L. & N. Special.....	9	3	2
Durham Fert. Co.'s Best Potato Manure.....	7	7	7
Durham Fert. Co.'s Blacksburg Soluble Guano.....	8	2	2
Durham Fert. Co.'s Standard Guano.....	9	2	2
Durham Fert. Co.'s Great Wheat and Corn Grower..	10	..	1.50
Durham Fert. Co.'s Carr's Special Wheat Grower..	8	..	4
Durham Fert. Co.'s Standard Wheat Grower.....	10	..	2
Durham Fert. Co.'s Blue Ridge Wheat Grower.....	10	..	2
Durham Fert. Co.'s Diamond Wheat Mixture.....	10	..	3
Durham Fert. Co.'s Double Bone Phosphate.....	13	..	..
Durham Fert. Co.'s Excelsior Dis. Bone Phosphate..	14	..	..
Durham Fert. Co.'s Standard High Grade Phosphate,	13	..	..
Lynchburg Guano Co.'s Golden Age Pure Bone Meal	20	4	..
Lynchburg Guano Co.'s Ironside Acid Phosphate....	16	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate....	12	..	..
Lynchburg Guano Co.'s Otter Brand Acid Phosphate,	10	..	..
Lynchburg Guano Co.'s Arvonian Acid Phosphate....	13	..	..
Lynchburg Guano Co.'s Lynchburg High Grade Acid Phosphate	14	..	..
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture	10	..	4
Lynchburg Guano Co.'s Alpine Mixture.....	10	..	5
Lynchburg Guano Co.'s Dissolved Bone and Potash..	10	..	2
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco	8	2	2
Lynchburg Guano Co.'s Lynchburg Soluble.....	8	2	2
Lynchburg Guano Co.'s New Era.....	8	2	1
Lynchburg Guano Co.'s Independent Standard.....	8.50	2	2
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8	2.75	4
Lynchburg Guano Co.'s Bright Belt Guano.....	8	2	..
Norfolk & Car. Chem. Co.'s Norfolk Reliable Acid Phosphate	10	..	..
Norfolk & Car. Chem. Co.'s Norfolk Best Acid Phos- phate	13	..	..
Norfolk & Car. Chem. Co.'s Norfolk Bone and Potash,	10	..	2
Norfolk & Car. Chem. Co.'s Crescent Brand Ammon- iated Fertilizer	8	2	1
Norfolk & Car. Chem. Co.'s Cooper's Bright Tobacco Fertilizer	8	2.50	3
Norfolk & Car. Chem. Co.'s Norfolk Truck and Tomato Grower	8	5	5

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Norfolk & Car. Chem. Co.'s Pretlow's Champion for Peanuts, Cotton and Corn.....	8	2	1
Norfolk & Car. Chem. Co.'s Genuine Slaughter House Bone	8	2	2
Norfolk & Car. Chem. Co.'s Bright Leaf Tobacco Grower	8	3	3
Norfolk & Car. Chem. Co.'s Genuine Slaughter House Bone made especially for Tobacco.....	8	2.50	2
Norfolk & Car. Chem. Co.'s Amazon H. G. Manure..	8	3	3
Norfolk & Car. Chem. Co.'s Norfolk Soluble Bone...	10	..	..
Old Dominion Guano Co.'s H. G. Bone Phosphate..	13	..	..
Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate	12	..	..
Old Dominion Guano Co.'s Planters' Bone and Potash Mixture	10	..	3
Old Dominion Guano Co.'s Miller's Special Wheat Mixture	8	..	4
Old Dominion Guano Co.'s High Grade Alkaline Bone and Potash.....	10	..	2
Old Dominion Guano Co.'s Dis. Bone and Potash....	8.50	..	2
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano	6	7	5
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano	7	7	7
Old Dominion Guano Co.'s Isley's Formula of Dis- solved Bone Potash Chemicals.....	8	3	3
Old Dominion Guano Co.'s Bullock's Cotton Grower,	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6	2	2
Old Dominion Guano Co.'s Osceola Tobacco Guano..	8	2.50	3
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano	8	2	2
Old Dominion Guano Co.'s Old Dominion Soluble Guano	8	2	2
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer	8	3	3
Old Dominion Guano Co.'s Farmers' Friend Fer- tilizer	8	2	2
Old Dominion Guano Co.'s Standard Raw Bone Solu- ble Guano	8	2	1
Old Dominion Guano Co.'s Old Dominion Potato Manure	7	5	8
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer	8	3	3
Powers, Gibbs & Co.'s Fulp's H. G. Acid Phosphate..	13	..	..
Powers, Gibbs & Co.'s Cotton Brand Acid Phosphate,	12	..	..
Powers, Gibbs & Co.'s Almont H. G. Acid Phosphate,	13	..	..
Powers, Gibbs & Co.'s Almont Wheat Mixture.....	10	..	3
Powers, Gibbs & Co.'s Cotton Brand H. G. Acid Phosphate	13	..	..
Powers, Gibbs & Co.'s Acid Phosphate and Potash..	10	..	1
Powers, Gibbs & Co.'s Dissolved Bone and Potash...	10	..	2
Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano	8	3	2
Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone	8	2	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
Powers, Gibbs & Co.'s Almont Soluble Ammoniated Guano	8	2	2
Powers, Gibbs & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.....	8	2.50	3
Powers, Gibbs & Co.'s Eagle Island Ammo'd Guano..	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano.....	8	2	2
Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano	9	3	2
Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano	8	4	5
Powers, Gibbs & Co.'s Old Kentucky H. G. Manure..	8	3	3
Powers, Gibbs & Co.'s Gibbs' H. G. Ammo'd Guano..	8	2.50	1
Powers' H. G. Ammoniated Guano.....	8	2.50	2
Southern Chem. Co.'s Tar Heel Acid Phosphate....	12	..	..
Southern Chem. Co.'s Horseshoe Acid Phosphate...	10	..	..
Southern Chem. Co.'s Elkin Acid Phosphate.....	12	..	..
Southern Chem. Co.'s Chatham Acid Phosphate....	13	..	..
Southern Chem. Co.'s Click's 16 Per Cent Acid Phosphate	16	..	..
Southern Chem. Co.'s Victor H. G. Acid Phosphate..	16	..	..
Southern Chem. Co.'s Comet 16 Per Cent Acid Phosphate	16	..	..
Southern Chem. Co.'s Red Cross 14 Per Cent Acid Phosphate	14	..	..
Southern Chem. Co.'s Reaper Grain Application....	12	..	3
Southern Chem. Co.'s Farmers' Pride Bone and Potash	10	..	3
Southern Chem. Co.'s Quickstep Bone and Potash...	10	..	1
Southern Chem. Co.'s Mammoth Corn Grower.....	10	..	2
Southern Chem. Co.'s Winner Grain Mixture.....	10	..	4
Southern Chem. Co.'s Winston Bone and Potash Compound	10	..	2
Southern Chem. Co.'s Mammoth Wheat and Grass Grower	10	..	2
Southern Chem. Co.'s Sun Brand Guano.....	9	2.50	5
Southern Chem. Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8	3	2.50
Southern Chem. Co.'s Yadkin Complete Fertilizer...	8	2	1
Southern Chem. Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8	2.50	3
Southern Chem. Co.'s Electric Standard Guano....	8	2	2
Southern Chem. Co.'s Electric Tobacco Guano.....	8	2	2
Southern Chem. Co.'s Click's Spl. Wheat Compound,	8	..	4
J. G. Tinsley & Co.'s Stonewall Brand Acid Phos...	10	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate....	14	..	..
J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	13	..	..
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture	10	..	2
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower..	6	4	4
J. G. Tinsley & Co.'s Stonewall Guano.....	8	2	2
J. G. Tinsley & Co.'s Lee Brand Guano.....	8	2	2
J. G. Tinsley & Co.'s 10 Per Cent Truck Guano....	5	10	2.50
J. G. Tinsley & Co.'s Stonewall Tobacco Guano....	8	2	2
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer...	8	4	2.50
J. G. Tinsley & Co.'s Irish Potato Guano.....	6	6	6
J. G. Tinsley & Co.'s Richmond Brand Guano.....	8	2	1
J. G. Tinsley & Co.'s Killikinnick Tobacco Mixture..	8	2.50	3

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
J. G. Tinsley & Co.'s Champion Acid Phosphate.	10	..	..
S. W. Travers & Co.'s Capital Dissolved Bone.	12	..	..
S. W. Travers & Co.'s Standard Dissolved S. C. Bone,	13	..	..
S. W. Travers & Co.'s Dissolved Bone Phosphate.	14	..	..
S. W. Travers & Co.'s Special Wheat Compound.	8	..	4
S. W. Travers & Co.'s Capital Bone and Potash Com- pound.	10	..	2
S. W. Travers & Co.'s Beef Blood and Bone Fertilizer,	8	2	1
S. W. Travers & Co.'s Capital Cotton Fertilizer.	8	2.50	1
S. W. Travers & Co.'s Capital Truck Fertilizer.	8	4	3
S. W. Travers & Co.'s Capital Tobacco Fertilizer.	8	4	3
S. W. Travers & Co.'s National Special Tobacco Fer- tilizer.	8	2	2
S. W. Travers & Co.'s National Fertilizer.	8	2	2
Va. State Fert. Co.'s Gilt Edge Brand Pure Bone Meal. (Total)	20	4	..
Va. State Fert. Co.'s Lurish Acid Phosphate.	10	..	..
Va. State Fert. Co.'s Alps Brand Acid Phosphate.	12	..	..
Va. State Fert. Co.'s Clipper Brand Acid Phosphate,	13	..	..
Va. State Fert. Co.'s Bull Run Acid Phosphate.	16	..	..
Va. State Fert. Co.'s Gilt Edge Brand Acid Phos- phate.	14	..	..
Va. State Fert. Co.'s Gilt Edge Brand Dissolved Bone and Potash.	8.50	..	2
Va. State Fert. Co.'s High Grade Dissolved Bone and Potash.	10	..	2
Va. State Fert. Co.'s Mountain Top Bone and Potash	10	..	5
Va. State Fert. Co.'s XX Potash Mixture.	10	..	5
Va. State Fert. Co.'s Bull Dog Soluble Guano.	8	3	3
Va. State Fert. Co.'s G. E. Special Tobacco Grower..	8	2.50	2
Va. State Fert. Co.'s Game Cock Special Tobacco.	8.50	2	2
Va. State Fert. Co.'s Battle Axe Tobacco Guano.	8	2	2
Va. State Fert. Co.'s Highland King.	8	2	1
Va. State Fert. Co.'s No. 1 Soluble Guano.	9	2	..
Va. State Fert. Co.'s Dunnington's Special Formula for Tobacco.	8	3	3
Va. State Fert. Co.'s Austrian Tobacco Grower.	8	2.50	2
Va. State Fert. Co.'s Va. State High Grade Tobacco Guano.	8	2	2
Va. State Fert. Co.'s Buffalo Guano.	8	2.50	3
Va. State Fert. Co.'s Va. State High Grade Guano.	8	2	2
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Ammon- iated Guano for Beans, Peas, Cabbage, Strawber- ries, etc.	6	7	6
S. W. Travers & Co.'s Travers' 7 Per Cent Truck Fer- tilizer.	6	7	5
J. G. Tinsley's Special Irish Potato Guano.	6	7	6
Durham Fert. Co.'s Standard Wheat and Corn Grower.	10	..	2
L. A. Carr's Special Top Dresser.	4	10	2
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Bone Meal.	15.85	4.60	..
<i>Williams & Clark Fertilizer Works, New York, and Charleston, S. C.—</i>			
Americus Ammoniated Bone Superphosphate.	8	2.25	1

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Am- monia.	Potash.
<i>Winborne Guano Co., Tyner, N. C.—</i>			
Winborne 7 Per Cent Guano.....	5	7	5
Winborne 3-8-4 Guano.....	8	3	4
King's Tammany Guano.....	8	2.50	3
Farmers' Select Guano	8	2.50	3
High Grade Excelsior Guano.....	8	2	2
High Grade Eureka Guano	8	2	2
High Grade Triumph Guano	8	2	2
Soluble Bone and Potash	10	..	2
High Grade Acid Phosphate.....	14	..	..
Genuine German Kainit .....	..	..	12
Winborne's Tobacco Guano	8	3	3
Standard 16 Per Cent Acid Phosphate.....	16	..	..
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Standard Vegetable Fertilizer	8	3	3
Standard Potato Fertilizer.....	8	2	5
Standard Grain and Grass Grower	8	2	2
Standard High Grade Acid Phosphate.....	14	..	..
Standard Bone and Potash Mixture.....	10	..	2
Lawn Enricher	5	3	3
Wood's Pure Animal Bone	23	3	..
Nitrate of Soda .....	..	19	..
Standard Corn Fertilizer	8	2	1
<i>Wilson & Toomer Fertilizer Co., Jacksonville, Fla.—</i>			
Davis' Truck Grower Special.....	6	5	5

THE BULLETIN

OF THE

North Carolina Department of Agriculture.

DEWBERRIES.

BY

F. C. REIMER.

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GARDEN



AN EXCELLENT CRATE OF LUCRETIA DEWBERRIES READY TO BE CLOSED FOR SHIPMENT.

AUGUST, 1907.

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION.

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THE BULLETIN

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 8.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, AUGUST, 1907.

DEWBERRIES. PRELIMINARY REPORT.

F. C. REIMER.

INTRODUCTION.

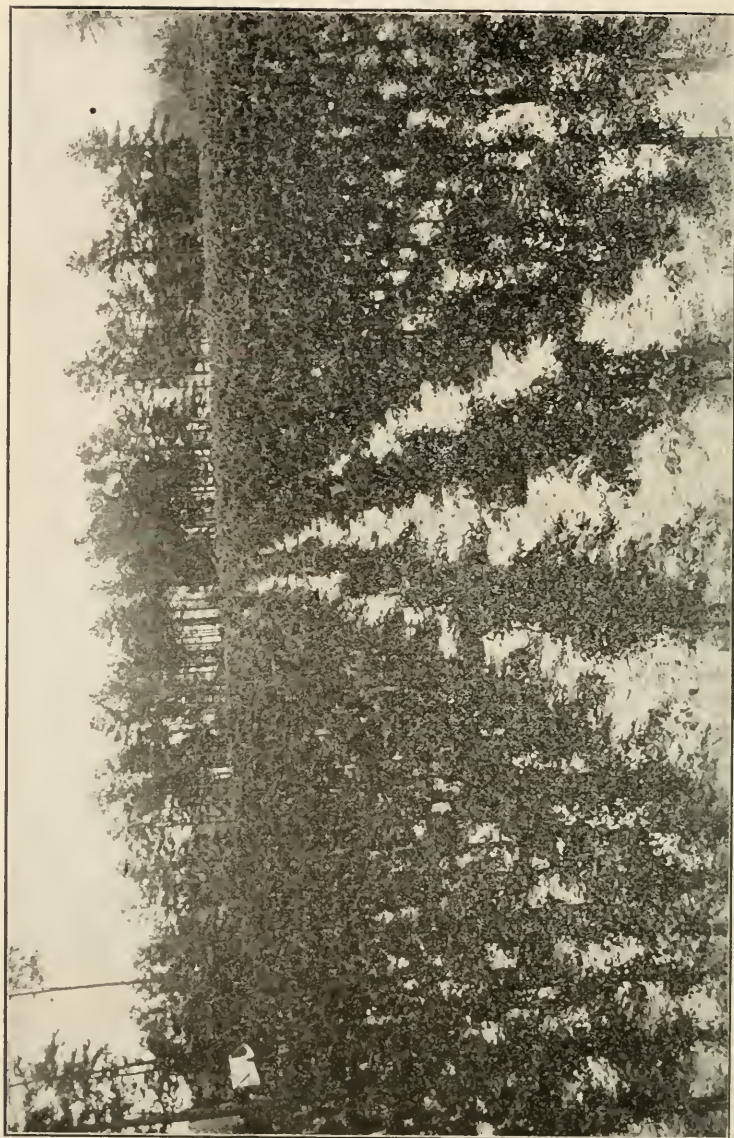
This is a preliminary bulletin on the dewberry. It is not intended as a final treatise on the subject. The writer is giving the subject of dewberries considerable study, is carrying on a number of experiments with them, and expects to publish more fully on certain phases of the subject at a later date.

The reasons for putting out this preliminary bulletin are that considerable interest is now being taken in the subject by many of our people, and that many immigrants are coming into the State, some of whom wish to take up the culture of dewberries, but know little about local conditions. In some instances beginners have failed in growing this crop, and it seems proper at this time to put out a preliminary bulletin covering the main points of dewberry culture as fully as possible for the benefit of these people. Primarily, this bulletin is not intended for those who have been in the business for a number of years.

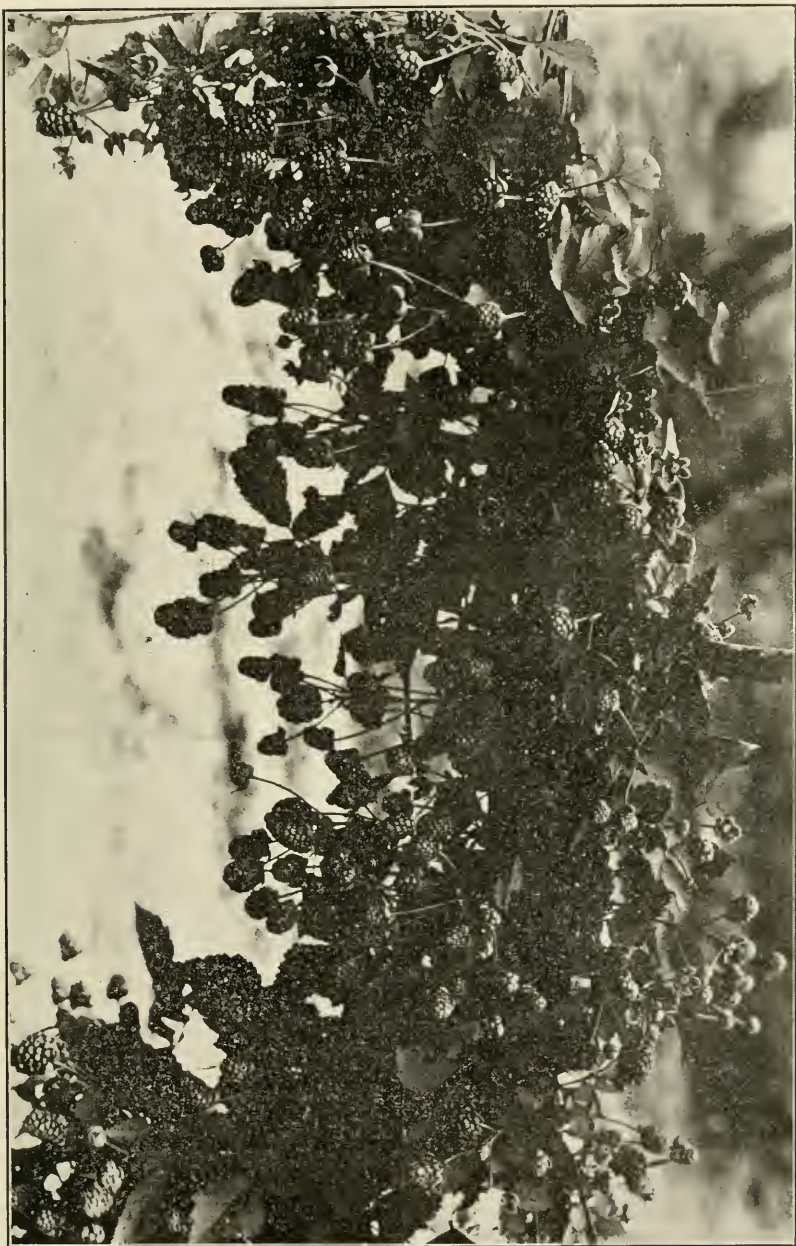
GENERAL DISCUSSION.

The dewberry is becoming an important crop in this State. It is being grown extensively in four or five different sections and on land which in most instances is not suited to many other crops. The profits realized have on the average been very good. In several sections this crop is bringing thousands of dollars into the community where formerly there was no horticultural industry. A plantation,

PLATE I.



Record Dewberry Field of North Carolina, owned by Mr. M. M. McKeithen, Cameron, N. C. Yield 252 crates per acre in 1906.



Heavy fruiting of Lucretia. Trained to single wire.

when well established and cared for, will last for at least ten or fifteen years, and when properly handled will last for a much longer time. It requires only two years to establish a plantation, and a fair crop is obtained the second year. When once established, the yield should be at least one hundred crates per acre, and the profits during good seasons about one hundred dollars per acre. There are instances on record where the profits have been considerably higher than that, in some cases running as high as one hundred and fifty dollars per acre. There is considerable land in this State to be bought for five dollars per acre, which is yielding the owners very little profit, and which could be made more profitable by growing dewberries.

The dewberry industry, at the present time, is centered in Moore, Cumberland, Columbus and Warren Counties, and a limited acreage is being grown in other portions of the eastern part of the State.

This crop can be successfully grown in any portion of the eastern part of the State, including the coastal-plain section, the sand-hill region, and portions of the lower Piedmont. The sandy soils seem to be especially well adapted to this crop. It cannot be successfully grown on low, wet or marshy soils.

The dewberry-picking season immediately follows the strawberry season, the bulk of the crop being shipped in June. This is an important matter, since it offers less competition on the market and there is little difficulty in securing refrigerator cars for shipping purposes.

While the dewberry is grown in this State principally as a commercial fruit, the fact should be emphasized that wherever possible it should also be grown for home use. It is an excellent fruit in its fresh state, splendid for canning purposes, and for jelly and jams is not excelled by any other fruit. Its season is earlier than the earliest blackberries, and continues for a long time. The blackberry is somewhat difficult to grow in the eastern half of this State, where the dewberry grows to perfection. It is a fact that altogether too little fruit is grown for home use in this State. This most excellent fruit should be found in every home garden.

ESTABLISHING A DEWBERRY FIELD.

SOILS.

Types of Soils.—The dewberry can be grown on a variety of soils. It does best on a soil that contains a large amount of sand. Even the poorest white sands of the sand-hill section, when properly handled, will yield excellent crops.

Usually, however, a sandy loam will give better results than a sandy soil. Sandy soils offer the drainage and warmth which seem to be essential to the dewberry, but such soils are very poor—that is, contain little plant food, suffer badly during a drought, hold very

little water, and are less satisfactory than the sandy loams. A sandy loam contains sufficient sand to provide necessary drainage, enough clay and vegetable matter to make the soil richer in plant food, and at the same time hold more moisture.

The ideal soil is a sandy loam with a clay subsoil, not deeper than about two feet. In all the dewberry sections of the State the best crops are produced on sandy loams underlaid with a clay subsoil, which varies in depth from six to twenty-four inches. These soils contain more plant food, and the subsoil prevents it from washing down into the lower layers of soil, where it is out of reach of the roots. Large amounts of fertilizer are used in dewberry growing, and the soils which are most retentive are therefore best.

Moisture.—The dewberry will not endure a very wet soil, yet the crop requires a large amount of moisture. This is especially true while the fruit is developing and ripening. It must always be kept in mind that the berry is composed largely of water, and this at once shows the necessity of plenty of moisture in the soil. On poor, open, sandy soils it is often difficult and sometimes almost impossible to supply the crop with enough moisture while the fruit is ripening. Thorough cultivation is, of course, the greatest remedy. Often the size of the fruit can be doubled by frequent cultivation at this time. A sandy loam soil underlaid with a clay subsoil is most retentive of moisture.

Humus.—Another important factor in retaining moisture is humus. Humus is decaying vegetable matter, such as leaf mould, compost, stable manure, and cowpeas. In an open, porous soil humus tends to fill up the spaces between the soil grains and helps to make such soils more compact. The humus itself acts like a great sponge, absorbing large quantities of water, and during a drought will help to retain it much better than a soil without humus. In many soils humus is quite as important as cultivation.

Drainage.—Dewberry fields should always be thoroughly drained. There are places in the State where dewberry plants are dying, and the only cause, as far as can be determined, is a soggy soil. A number of plants examined in these fields show that the roots are actually rotting. The water excludes air from the soil and tends to smother the roots. In the same fields where the soil is well drained this condition does not exist, and as the soil is rich and moist the plants are growing luxuriantly and yielding excellent crops. The remedy, of course, would be to drain thoroughly those portions of the field which are too wet. It is a waste of time and money to plant dewberries in a low, wet soil. Many of these soils, however, are excellent when well drained.

PREPARATION OF SOIL.

Most of the soils in this State which are well adapted to dewberry growing contain a very small amount of plant food and little or no humus. These soils must be greatly improved if the best results are to be obtained. Plant food and humus must be supplied in some form. If this can be done before the plants are set out, so much the better. In preparing the soil for the dewberry crop it is well to begin two or three years before planting. By a rotation of crops and by using legumes—for example, cowpeas or crimson clover—the land can be very much improved, and if these crops are turned into the soil a large amount of humus is also added. Some of the poorest soils, when treated in this way, will yield good crops of dewberries.

The land is prepared every season for annual crops. The dewberry is a perennial plant and occupies the land for at least ten years; hence, the preparation of the land must be more thorough than that for annual crops, like corn and cotton. Plowing should be very deep, and if the land is underlaid with a clay subsoil which comes near the surface, it becomes necessary to use a subsoil plow to break up this hard layer. This is for the purpose of giving depth to the soil, so that it will supply a greater feeding surface to the roots, will offer better drainage, and during a drought will help to retain the moisture. If the soil is at all rough it should be thoroughly pulverized before planting; this can be done with a heavy roller. Usually, however, this condition does not exist in most of our dewberry sections.

PROPAGATION.

The dewberry is easily propagated, two methods being commonly employed.

Tip Layers.—This method is generally employed in this State in propagating the dewberry, and usually it is the most satisfactory. It is quite easily performed. The tips of the long vines are covered with soil in the fall, and, as soon as they have formed a good root system, are ready to be cut off from the parent plant and planted in the field, where they are to remain permanently. Usually we have found it very satisfactory to cover them in September, and then transplant them in December. This gives a good opportunity for fall planting. Many growers do not transplant them until early the following spring—some time during March. In that case it is not necessary to cover them until later in the season—say October or early November. This has the advantage of allowing the vines to grow later in the fall before the tips are covered.

It is best for this purpose to select good, strong, healthy plants, and from these plants select the strongest vines, and also those freest from disease or bruises of any kind. This will give better results in the new plantation.

The importance of selection in growing dewberry plants is often overlooked. Many growers will cover up almost any vine, and the more vines that can be covered up, the better. This is a bad practice. We know that the offspring will be very much like the parent from which it came. If the parent produces little or poor fruit, is a poor grower and a sickly plant, the offspring in nearly every instance will possess these same characteristics. This is because the young plant comes from a portion of the old plant—a portion of the stem.

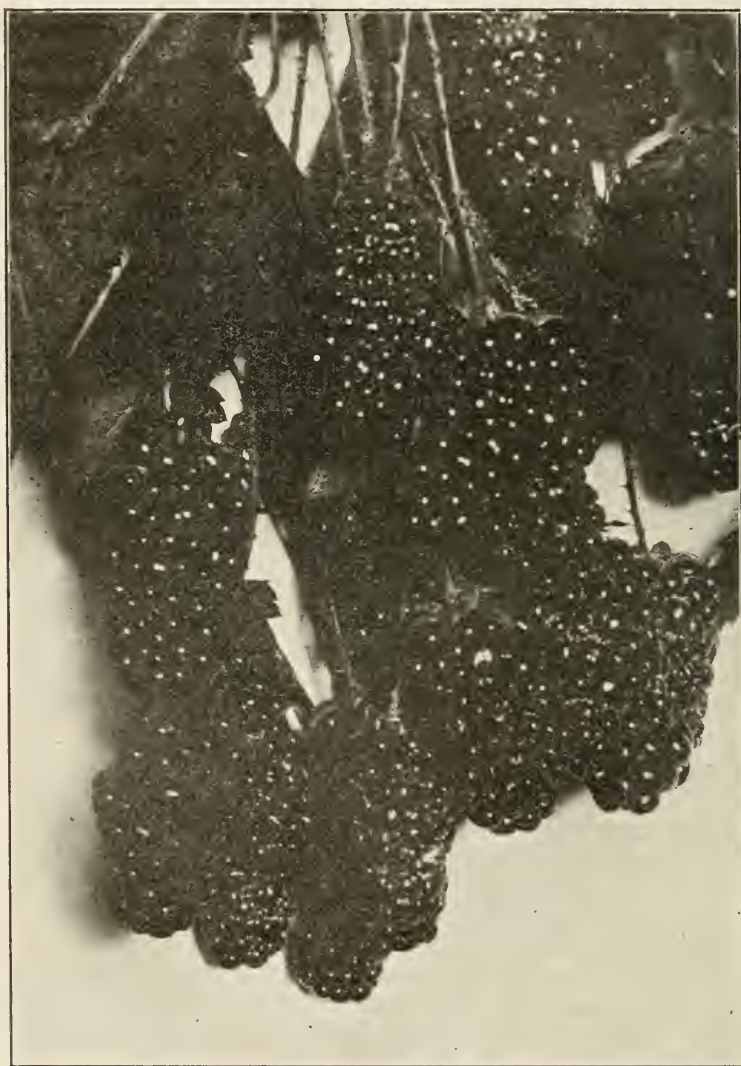
To secure the very best results it is necessary to go into the field while the fruit is still on the vines and mark in some way those plants that come nearest to the grower's ideal; then, in the fall, the grower can select these plants for propagation. If one waits until fall to do his selecting, he usually knows very little about the fruiting qualities of his plants. There is just as great difference between dewberry plants in a field as there is between the best ears of corn and the poorest nubbins in the corn field; and no one would think of planting the corn that came from nubbins ears. This is a matter which should receive more attention from growers in the future.

Sometimes plants are selected for propagating purposes which are badly infested with anthracnose. This simply means that the disease is carried from parent to the young plant. By all means avoid such plants in propagation work.

Some of the growers do not even cover up the plants with a hoe, as should be done. They depend upon the canes being accidentally covered at the last cultivation. This, of course, will give plants, but in many cases poor as well as good plants are secured. It is a bad practice.

Root Cuttings.—This method of propagating the dewberry is seldom employed in this State. It consists in making cuttings two to three inches long and one-quarter to one-half inch thick, from the roots of old plants, planting these out in nursery rows about two to three feet apart, and covering the roots about one to two inches. This method has the advantage of giving a large number of new plants from a few old plants. It has another advantage, in that no disease, such as anthracnose, is carried from parent to the young plant. It has the disadvantage of not making strong-bearing plants as quickly as the tip-layer method. Of course, when this method is employed, the same precautions should be taken that were suggested in the tip-layer method.

The best time for making these root cuttings is during the fall; they are stored in sand or sawdust over winter and are ready for planting in spring. The soil should be kept mellow and moist until the young plants are well established. It is best to grow these in nursery rows the first season instead of planting them out in their



Cluster of fine Lucretia Dewberries. Natural size.



Cluster of Lucretia Dewberry Flowers and Buds.

permanent places. Cultivation can be more easily practiced and the plants better cared for in every way.

PLANTING.

Varieties.—Only one variety is extensively grown in this State at the present time. This is the *Lucretia*. It has given far better satisfaction than any other variety so far tried. It is a vigorous, healthy plant, producing a large amount of large, firm fruit. It is quite subject to anthracnose, however, and this is its chief defect. It may be that we shall find an even better variety in the future; at present, however, we recommend the *Lucretia* only.

Time of Planting.—The dewberry can be planted during the fall, winter or spring. Usually, only fall and spring planting are practiced in this State.

Fall Planting.—In general, fall planting is preferable. At this season of the year there is usually a large amount of moisture in the soil and air. The plants require only a small amount of moisture, as practically no growth is taking place, and they become fully established before the growing season commences the following spring. They make a much more vigorous growth and are better prepared to withstand any drought the following spring or summer. November and December are the best months.

If one has a heavy clay soil that tends to heave badly during the winter months, it may be best to practice spring planting. Such soils are seldom used in this State for dewberry growing.

Spring Planting.—In this State spring planting is most commonly practiced. Why such is the case the writer has never been able to determine. No good reasons have ever been advanced by any planter for planting in the spring. The disadvantages are spring droughts, the plants are not well established when growth commences, and are not able to make as vigorous growth or withstand the hot weather of spring and early summer. We know of instances where at least one-fourth of the plants have died when planted in the spring. If planted in the fall there is little necessity for any of the plants dying. If they are properly handled, not more than one in fifty should die. If spring planting is practiced it should be done just as early as possible—certainly not later than the first of April, and the first half of March is undoubtedly the best time.

Setting the Plants.—The plants should be carefully dug and planted as soon as possible after digging. Do not expose the roots to the air and sun any longer than is absolutely necessary. If the young plants are to remain in the field for some time before they can be planted, the roots should be covered with soil or with old wet blankets. The holes should be made sufficiently large, so that all of

the roots can be well spread out, and in filling in the dirt around the roots it should be firmly packed. In many instances the death of the plant, especially where spring planting is practiced, is due to lack of thoroughly packing the dirt around the roots. Under these conditions open spaces often remain around the roots, they cannot secure moisture from the soil, and dry out badly.

Distances.—The distances apart for planting depend entirely on the method of training and cultivation to be practiced in the field. When the canes are trained to stakes the plants are usually set in squares, from $4\frac{1}{2} \times 4\frac{1}{2}$ to 6×6 feet apart each way. The richer the soil and the more intensive the culture, the closer the plants can be set. If the soil is poor and the cultivation not thorough, $4\frac{1}{2} \times 4\frac{1}{2}$ feet is altogether too close. Plants require a large amount of plant food, and are unable to get it in a poor soil. When planted on poor soil, it may be well not to put the plants closer than 6 feet apart. The writer believes that, in general, where good cultivation is practiced, 5×5 to $5\frac{1}{2} \times 5\frac{1}{2}$ feet are the best distances.

When the canes are trained to wires the rows are placed from 8 to 10 feet apart and the plants from $1\frac{1}{2}$ to 2 feet apart in the rows. The chief objection to this method is that the ground is not utilized to the best advantage; in one direction the plants are too far apart; in another they are too close together. The space in the center between the two rows lies almost idle, as the roots cannot get to the plant food, and there is too great competition for the moisture and plant food in the row.

CULTIVATION THE FIRST SEASON.

The first season the plants are not trained, but simply allowed to grow on the ground. The cultivation, of course, must be more thorough during this season than is necessary after the plants are fully established. The soil must be kept mellow, moist and absolutely free from weeds. Sometimes the weeds begin growing near the crown of the plant, where they cannot be destroyed by the cultivator. In that case hoeing must be resorted to. This should be done as soon as the weeds appear. The young dewberry field should not be allowed to battle with weeds. The plants are not cut back or cut off during this season, as they are when they begin fruiting the second year.

FERTILIZING THE FIRST SEASON.

An application of 400 to 500 pounds of cotton-seed meal, per acre, should be given in the spring, soon after setting out the plants.

TREATMENT THE SECOND SEASON.

Beginning with the second season, the treatment differs in some respects very materially from that given the first season. The first operation the second season is that of training or tying up the plants.

TRAINING.

Two methods are employed in training dewberries—the stake and the wire methods.

Training to Stakes.—By using this method of planting and training, the plants are equally distant apart in both directions, and cultivation in two directions can be practiced. This is an important matter, especially in this State, where labor is now so scarce. Very little hoeing need be done where this method of planting is employed. The disadvantage is that it requires a large number of stakes, which in some sections are rather costly.

Stakes.—In this method, stakes high enough to support the plants are placed at each hill. These should be about 7 feet long, being placed in the ground 2 feet deep, and extending above the ground at least 5 feet. The thickness of the stake varies considerably among different growers. In some instances growers are using a stake that is really larger than is necessary. If the wood is of the proper kind, a stake about 2 inches square is sufficient, although some as large as $3\frac{1}{2}$ to 4 inches square are in use.

The stakes should be of the very best kind of wood obtainable for this purpose. They should be strong, rigid and very durable, and should last, if possible, as long as the plantation does. This means that there are only a few kinds of wood which are well adapted to this purpose. The best kind in use at present—and nothing better can be suggested—is the heart wood of long-leaf or yellow pine. This usually contains a large amount of pitch, which makes it very durable. The sap wood of this pine will not answer the purpose; the stakes rot too readily. In some sections in the eastern part of the State white cedar (*Chamaecyparis thyoides*), more commonly known in this State as juniper, can be had, and is excellent for this purpose. Red cedar, the heart wood of short-leaf pine, and white oak can also be used with good results.

The setting of the stakes is an important matter. Great care should be taken in distributing the stakes throughout the field, being careful not to drop any of them on the vines, as this bruises and breaks the vines and often renders them useless for bearing purposes. In setting the stakes, care should be taken not to injure the crown of the plant. It should be placed at least 2 or 3 inches from the center of the crown and driven into the ground so that it will stand in a perfectly upright position. This will prevent trouble in cultivation,

PLATE V.



Dewberry Plant trained to a single stake.

and the plant is not so apt to break the stake off at the surface of the ground when supporting a heavy plant and crop.

Tying.—The most important operation in connection with training is that of tying up the plant. Great care should be taken and only trustworthy persons used for this work. The vines are carefully gathered together, coiled around the stake in a spiral form, and tied at two or three different places. In tying it at two places, tie about the middle of the stake and again near the top; in tying at three places, the first cord is placed about 2 feet above the ground, the second $3\frac{1}{2}$ feet, and the third near the top of the stake. In general, it is best to tie at three places, as the plant is supported in much better condition. (See Plate V.) The cord used in tying should be soft, so as not to cut into the cane. Raffia can also be used for this purpose. It is extremely strong and cheap, but tends to cut into the vines more than the soft cord. The cord should not be drawn so tight as to injure the vine. The vines are usually so long that they exceed the height of the stake by two or three feet; these ends must be cut off. By cutting off the ends, many more laterals are formed on the remainder of the vines, and usually the fruiting is much heavier. The cutting-off is done with a pair of hand pruning shears.

Training to Wires.—In this method the rows are from 8 to 10 feet apart. Strong posts are set 40 feet apart in the row, along which either one or two (No. 9) wires are stretched. With this method cultivation can be practiced in one direction only, increasing the amount of hoeing. Its advantages are cheapness in sections where stakes are difficult to obtain, and the rows are far apart, allowing a wagon to pass between them for hauling out old canes, distributing manure and fertilizers. It allows as many, or more, plants to the acre as the stake method.

Two-wire Method.—Two wires are better than one, as they support the plant in much better condition and are more satisfactory in every way. The first wire is placed about $2\frac{1}{2}$ feet from the ground, and the upper wire about $4\frac{1}{2}$ to 5 feet, and the tying to these wires is very similar to that in the stake method. (See Plate VI.)

A modification of this method, and one which has an advantage, is to gather up the vines in a bunch, tie them to the lower wire, then divide the bunch of vines and tie each half, about 12 inches apart, to the upper wire. This does not crowd the vines so badly, and gives far more light and room for development. It has the disadvantage of requiring two tyings to the upper wire for each hill.

One-wire Method.—The one-wire method, which is used somewhat in this State, is in some respects quite unsatisfactory. There are several modifications of this method; one is to have the wire



Dewberry Plant trained to two wires.

stretched about 2 feet from the ground, throw the vines over this wire, and let them grow at random. The great disadvantage of this is that, if the vines are long, the upper end of the vine lies on the ground, being elevated only at the middle of the vine. A large portion of the fruit actually lies on the ground, where it is badly shaded, remains wet, becomes covered with sand, and in some instances rots badly. The vines are also blown about by the wind, bruising many of them where they cross the wire.

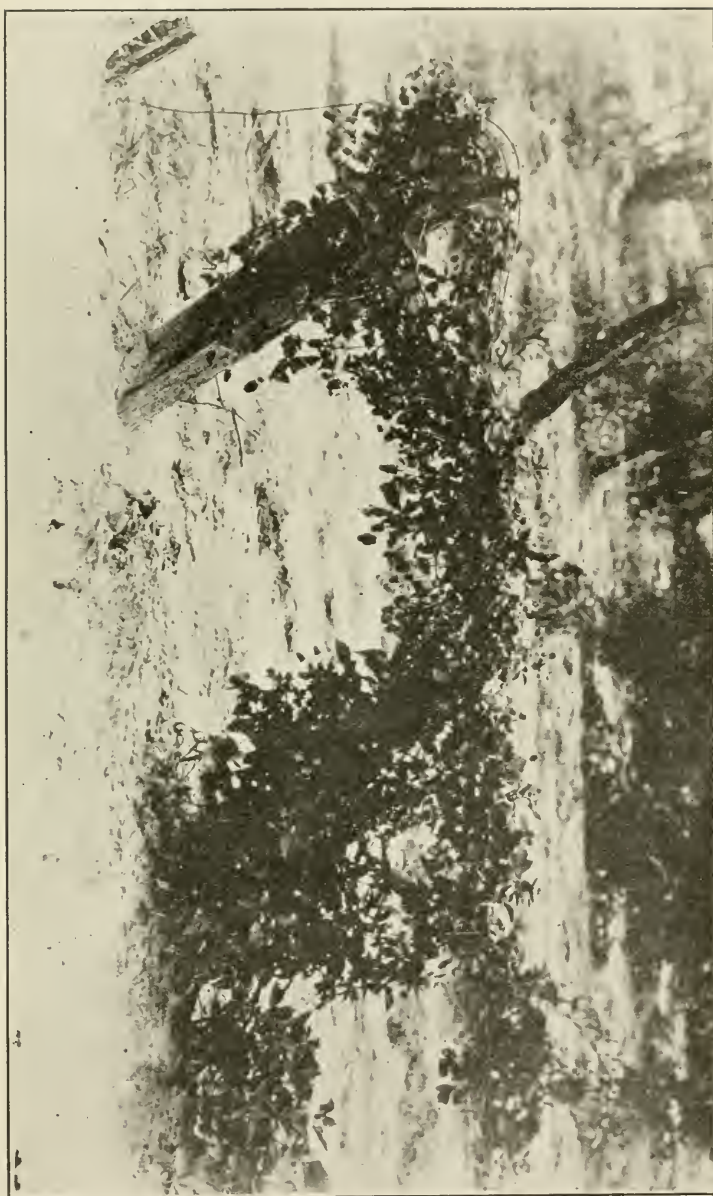
Another modification of this method is to draw the wire about 3 feet from the ground, bring the vines up to this wire, tie them, and then train the vines along this wire in both directions. (See Plate VII.) The chief objection to this method is that, if the plants are planted as closely as they should be, the vines will crowd badly on this wire; in general, it is not to be recommended. In fact, no form of the single-wire method is recommended by the writer.

CULTIVATION.

The cultivation, as has already been suggested, must be very thorough. The second season it should begin immediately after tying up the plants, and then should be kept up vigorously just as long as the young growth will allow it; in many instances it could be continued much longer than it is by some of our growers. Even if some of the young growth is broken or entirely destroyed, it does not injure the plant, since all of this growth is destroyed later on in the season. The plant requires an enormous quantity of water at the time the fruit is ripening, as it enlarges very much at this time, and the amount of moisture in the soil has a great influence on the size of the berries produced. If the amount of moisture is not sufficient the berries are small, and if the soil is very dry the berries often shrivel up and never ripen; hence the importance of cultivation at this season.

The cultivator should be composed of a large number of small teeth instead of a few large ones. A perfect mulch should be kept on the surface all the time, never allowing it to become hard or crusted. By keeping such a mulch the moisture is retained in the soil.

The number of cultivations will depend somewhat upon the season and conditions. It is almost impossible to state just how often one should cultivate. In general, once a week is not too often. The cultivation should be given just as soon as practicable after every shower of rain. This can be done in all the dewberry sections, since the soil is of a sandy nature and is not injured by cultivation when wet. By practicing this, the soil does not become hard and compact, and it helps to conserve the moisture in the soil. The importance of such thorough cultivation is usually not appreciated by most of our



Dewberry Plant trained to a single wire.

growers. They think all that is necessary is to keep the field free from weeds. The field, of course, should be kept free from weeds, but this is a secondary matter, compared with the importance of retaining moisture.

If cultivation is continued late, it is important to see that as little of the fruit as possible is torn off. Another important matter is to keep the cultivator and singletree from injuring the fruiting vines. Often canes that are broken in this way fail to mature their fruit. The fruiting dewberry vine is quite slender, brittle and easily broken. Every precaution should be used to prevent injury. The singletree should be as short as is possible to use it; no projections of any kind should be on the harness or sides of the cultivator. Usually the greatest amount of injury is done with a long singletree. The cultivator should not be handled by a shiftless, careless laborer. If one expects to go into the dewberry business with the idea of giving it no supervision and leaving the care of the field to the average careless laborer, my advice to that man is to invest his money in some other crop or business. One of the best cultivators is the Planet Junior, although there are a number of others which are very satisfactory.

ANTHRACNOSE AND ITS CONTROL.

At present, anthracnose is the most dreaded disease of the dewberry. The disease is characterized by Lodeman* as follows:

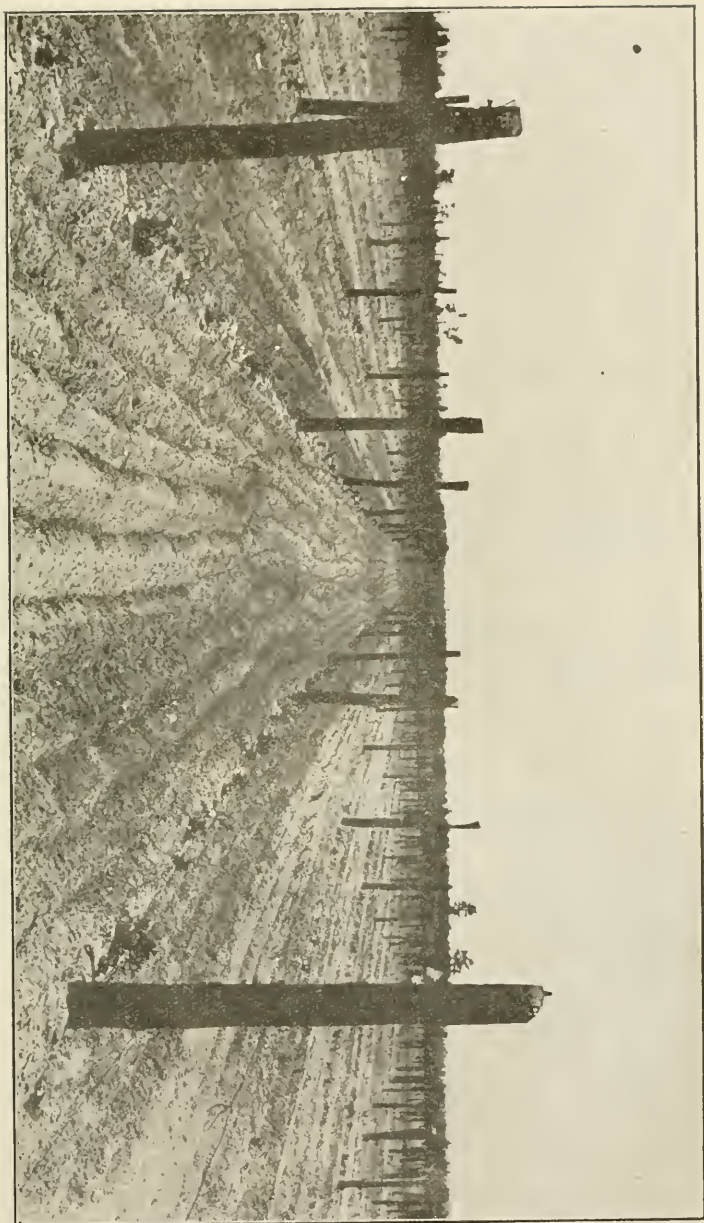
"This fungus attacks the young canes of raspberries, blackberries and dewberries. The affected parts are circular, but later oval in outline; the central part is gray in color, and this is surrounded by a distinct purple rim. These areas are sunken, and when several run together they may cause the cracking of the cane, or even its death. The leaves are also attacked to a limited extent, but with no such serious results. When the fruit stems are diseased, the berries are frequently prevented from ripening, and consequently they dry up on the bushes."

Spraying is of little value in treating this disease. It can be held in check only by cultural methods. The old canes become badly infested with the disease, and must be destroyed immediately after picking. They are of no further value to the plant, as they soon die after the fruit is picked. If they are left in the field for some time the fungus spreads rapidly from old to young canes, and the following year the plants are again seriously infested with the disease.

The common practice at present is to cut off and burn the entire plant, both old and new canes, immediately after picking. (See Plate VIII.) This keeps the disease in check, although it does not eliminate it. The disease is always present, but by practicing this method it is checked to such an extent that it seldom becomes serious.

*The Spraying of Plants, page 355.

PLATE VIII.



Fighting Anthracnose. Canes have all been removed and the young shoots are just beginning growth again.

At present the cutting-off is usually done with a pair of hand pruning shears. Another excellent tool is a pair of shears with long handles and long curved blades, made by a local blacksmith; it has the advantage of cutting more vines at a time and requiring little or no stooping. It can readily be made by any good blacksmith. In cutting off the vines, care should be taken to cut as close to the ground as possible; the stubs should not project above the ground. Often in dewberry fields one finds a great many plants shriveling and the vines actually dying because these old stubs had been left during the previous season and the young vines had simply grown from these old dying stubs. Another disadvantage is that the anthracnose is left on these old stubs and is carried over to the young vines the following season.

CULTIVATION AFTER CUTTING OFF THE CANES.

After the canes have been cut off it is necessary to make enough new canes during the remainder of the season for the following year's crop. This means cultivation of the most thorough kind. The cultivation should begin immediately after cutting off, and should be repeated as often as possible, giving at least one cultivation per week. As soon as the new vines are long enough to interfere, cultivation should cease.

If there are any weeds near the crowns of the plants, hand-hoeing must be resorted to. It is practically impossible to get a great many of the weeds which are clustered immediately around the old crowns with a cultivator. These should be carefully removed with hoes and hands.

STABLE MANURE.

Few growers realize the great importance of stable manure in dewberry culture. Some, however, who have tried it know that it is of the greatest importance.

Stable manure is usually richer in nitrogen than in potash and phosphoric acid, and hence is not a well-balanced fertilizer for dewberries. Where growth alone is desired, it answers the purpose quite well. Where a large crop of fruit is wanted, the manure cannot be relied on when used by itself.

Stable manure has a far greater value than that of adding plant food to the soil. It is composed largely of humus, or vegetable matter, which is in the very best condition possible for the soil. The great value of humus has already been discussed in a previous paragraph. It should be added that stable manure has also the power to set free plant food present in the soil, especially potash.

It is possible to use too much stable manure, which has a tendency to make too much vine at the expense of fruit, but there is little danger of using too much in this State, especially in the dewberry sec-

tions. The great danger is in not using enough, because it is rather difficult to obtain. The writer would recommend using as much as could possibly be obtained. Ten large loads per acre per season is a fair amount to use. Twenty loads every other year will about answer the same purpose. The best time to apply stable manure is during the winter months. It is impossible to do this, because the vines at this time of the year are lying prostrate all over the surface of the ground, and if one attempts to haul in or carry in manure many of the vines will be badly broken and injured; hence, the manure must be applied either in early spring, immediately after tying up the plants, or in summer, immediately after cutting off the canes. Spring is probably the best time, since the crop will receive the benefit of the humus and the plant food in the manure, especially the nitrogen, which will become available in the early part of the summer and can be taken up by the plants about the time the canes are cut off. This is when it is most needed by the plants, as this is the season for cane growth.

FERTILIZERS.

The subject of fertilizers is one of the most important connected with dewberry culture. The soil is usually poor, and large quantities of plant food must be supplied. Commercial fertilizers are rather costly; hence the importance of using them economically.

Usually two applications are made during the year—one in early spring, immediately after tying up the plants, and another in summer, immediately after cutting off the canes. These two applications will be discussed separately.

Spring Application.—This application is largely for the purpose of making the fruit. The canes have already been made during the previous season, and cane growth during the early part of the season is of secondary importance. The fertilizer added should be such as will give the largest amount of fruit. It should consist largely of potash and phosphoric acid, the two principal compounds in the making of fruit. More nitrogen than phosphoric acid is required by the fruit, but on our soils we find that in nearly every instance larger applications of phosphoric acid than nitrogen give better results.

The amount to be used depends somewhat upon the distance apart of the plants and the intensity of culture. The more plants per acre and the more intensive the culture, the larger the amount of fertilizer.

The kinds and amounts of fertilizers used for dewberries in this State vary considerably. It is impossible to say what kind and amount would be best for all conditions. In fact, there is no fertilizer that is best for all conditions, as this is so largely influenced by the character of the soil and the treatment it has received in previous years. Each grower must experiment for himself, to a certain extent, to see just what his soil requires. If the writer knew nothing

of the previous treatment of the land, he would recommend about 750 pounds of a formula something like the following:

10 per cent potash,
8 per cent phosphoric acid,
2 per cent nitrogen.

The following table will give about the amount of fertilizing material required to give the above percentages:

400 pounds of acid phosphate (14 per cent).
150 pounds muriate of potash,
200 pounds of cotton-seed meal.

In many instances this formula might possibly not give any better results than some other formulas now used by dewberry growers.

While phosphoric acid and potash are by far the most important ingredients, it is best to use a small amount of nitrogen, as indicated in the formula. The amount of nitrogen here given is equal to only about one-fourth of the amount of phosphoric acid and one-fifth of the amount of potash. The plant must make some growth at this season of the year, and also requires nitrogen for the development of the fruit.

Summer Application of Fertilizers.—This application is made immediately after cutting off the plants. The fertilizer is for the purpose of making canes during the remainder of the season which are to produce the following year's crop. The element which is most important in making cane growth is nitrogen; hence, the fertilizer should consist largely of this element. Some potash and phosphoric acid are necessary, since the fruit buds which produce the next year's crop are formed, in a large measure, during the fall. Cotton-seed meal is most commonly used and is an excellent fertilizer for this purpose. It consists largely of nitrogen, and also contains some potash and phosphoric acid. At present the writer cannot recommend anything better than an application of 600 to 700 pounds of cotton-seed meal, or 500 pounds of cotton-seed meal and 100 pounds of nitrate of soda, the latter being for the purpose of starting growth quickly.

TREATMENT THE THIRD SEASON.

Beginning with the third season, the treatment each season is exactly like that recommended for the second season.

HARVESTING AND MARKETING.

Picking.—It is hardly necessary to emphasize the importance of great care in picking the fruit. It should not be picked until it is fairly well colored, still it must be picked before the berry becomes thoroughly ripe, since it must be firm for shipping purposes. It should be picked as soon as it is well colored.

The fruit should not be picked while it is wet. More fruit is probably lost in transportation because of this one difficulty than from any other cause. While the fruit is wet it rots rapidly and cannot be shipped any great distance. Never pick immediately after a rain or a heavy dew.

The pickers should have close supervision, so that the fruit is not mashed in picking. No berry will carry to market when badly bruised, and no treatment after picking will remedy the bad effects resulting from poor picking. As soon as the fruit is picked it should be rushed to the packing-house. Often quarts remain in the field for hours after being picked; this is a bad practice, to say the least. The fruit should be put in the shade as soon as possible after picking, and kept cool. To leave it in the hot, broiling sun will ruin it in a short time.

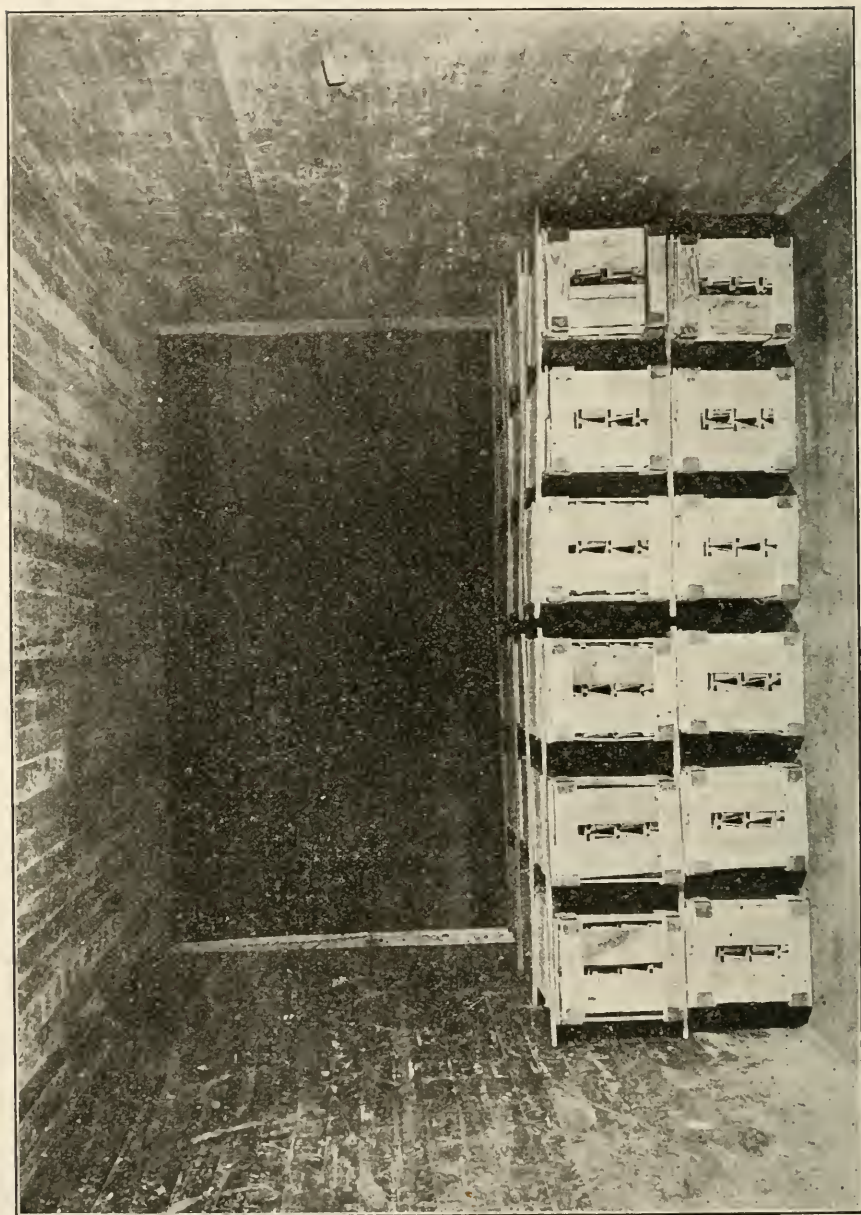
Packing.—Usually the fruit is picked directly into the receptacle in which it goes to market. The only packing that is practiced in the shed is a slight rearrangement of the top layer of fruit in the quart. This is to make the quart appear attractive, to have it full, and still not too full. In getting the quarts too full there is great danger of the fruit on top being badly mashed. All unnecessary handling should be avoided; hence the importance of careful picking in the field. Often many stems are left on the fruit in the quarts. This has a tendency to carry the fruit to market in better condition, but this advantage is largely overcome by the bad appearance of the fruit on the market.

In this State the 32-quart crate is used for shipping dewberries. The frontspiece shows how the crate should appear when ready to be closed up.

Shipping.—The earliest fruit must of necessity be shipped by express. This increases the cost of marketing considerably, but one can afford to pay this, since the fruit brings a higher price at this season. The express from most sections in this State is about as follows: \$1.25 per crate to Boston, and \$1 per crate to New York.

Very often express is very roughly handled, but it seems almost impossible to prevent this; still the grower should insist, wherever possible, that the crates should be handled with the utmost care.

Refrigeration.—The bulk of the crop is shipped in refrigerator cars. Since the dewberry follows the strawberry season in this State,



View in end of refrigerator car. Crates only two layers deep. Notice open spaces between the crates for free circulation of cold air.

there is usually no difficulty experienced in getting refrigerator cars. At present railroads will not handle refrigerator cars unless they contain at least 100 crates, and the freight per crate is higher than for cars containing 200 crates. Usually 200 crates are put in a car, being placed two layers deep, six layers wide and sixteen layers lengthwise in the car. This in an average car gives 192 crates. Usually eight more crates are added per car, these being placed on top of the second layer, near the ends of the car. The crates should be packed as illustrated in Plate IX. Notice the space between the crates in the car; this is to allow good circulation of the cold air. Small slats are also nailed across the crates, so as to hold them snugly in place. There should be no shifting or jarring of crates in the car. The cost of shipping (from Cameron, N. C.) in a refrigerator car containing 200 crates is 97 cents per crate to New York and Philadelphia, and about \$1.14 to Boston and Western cities.

Selling.—The fruit is usually sold through commission men in the larger markets. The grower should watch the markets from day to day, to see that he does not ship his fruit to markets that are already glutted. Very often growers will ship their fruit to a market which the previous day gave the highest price. This in many cases brings an overflow of fruit into this market. Proper distribution of fruit to various markets is a subject which must be given far more consideration in the future. Very often one market will be flooded, while there is a scarcity in another market. If the dewberry growers would get some one man—as the strawberry growers do in the eastern part of the State—to distribute the fruit properly in the various markets, it would come very near solving the difficulty of too low prices.

CONCLUSION.

In conclusion, the author wishes to state that there are several very important problems in dewberry culture which must be worked out experimentally. Some of these are: the best method of fighting anthracnose, causes and remedy of "double flowering," best method of cutting off canes, best methods of fertilizing, and the subject of varieties. These are now receiving thorough study in an experimental way by the author, and will be discussed in a future bulletin as soon as sufficient data is procured.

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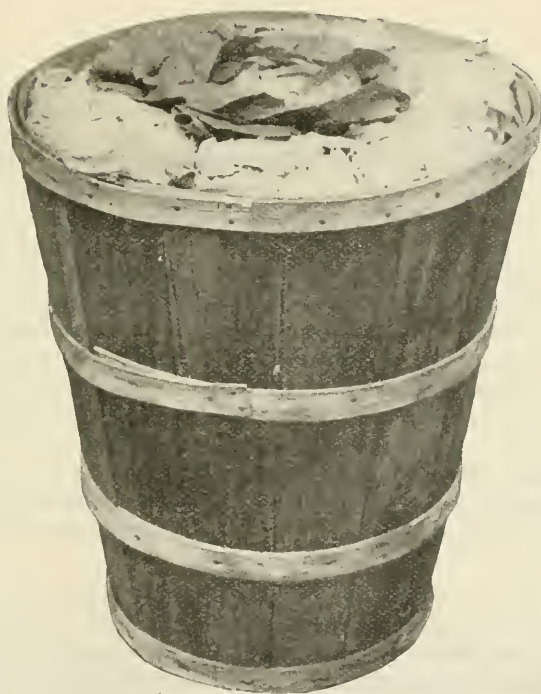
North Carolina Department of Agriculture.

LETTUCE-GROWING IN NORTH CAROLINA.

BY

W. N. HUTT,
STATE HORTICULTURIST.

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SEPTEMBER, 1907.

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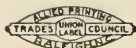
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THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 9.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, SEPTEMBER, 1907.

LETTUCE-GROWING

IN

NORTH CAROLINA.

W. N. HUTT,

STATE HORTICULTURIST.

Lettuce-growing in eastern North Carolina during the fall, winter and early spring months, for shipment to northern markets, has become an industry of very considerable importance. The mild climate of the costal plain of North Carolina, moderated by its proximity to the ocean, the warm winter sunshine of this southern region, together with a loose, warm, loamy soil, give apparently ideal conditions for the growth of the lettuce plant. A decade or two ago it was not believed that a soft, succulent plant like lettuce could be grown to perfection in this State during the winter months, but experience has amply shown that the finest quality of lettuce can be grown during the winter and, in many places, without any protection whatever.

The lettuce grown in covered frames in winter in North Carolina is the finest of its kind. It goes to market in competition with that produced in Florida and in the greenhouses of northern cities. Market records show that North Carolina lettuce brings at all points the highest prices. The northern cities, especially in spring, are always looking for fresh early lettuce. The North Carolina spring lettuce goes to market when the northerner is beginning to tire of his long winter and is sighing for something green. When the North Carolina crop goes forward it takes precedence over lettuce grown farther south. It, in its turn, gives place two weeks later, when the Norfolk

product goes forward. Fifteen miles in latitude counts for a day's difference in earliness, or a hundred miles south means about one week in earliness for northern markets.

LETTUCE CENTERS.

The area devoted to lettuce culture in North Carolina is not large, as the crop is grown by intensive methods of culture which lend themselves to restricted rather than to extensive operations. Wilmington, New Bern and Fayetteville are at present the centers of the industry. Each of these centers represents a special phase of the industry. Wilmington, being far south and having a very mild climate, is the center of a region where much lettuce is grown in covered frames and without heat, while still more is grown in open fields with no protection whatever. New Bern is noted for large lettuce outfits, where lettuce is forced by steam heating and irrigation. The Fayetteville lettuce industry is unique, being largely confined to small lots and parcels of land in and immediately surrounding the town. From these three centers the industry is extending to many other localities. The great demand for North Carolina lettuce will undoubtedly increase the present industry and cause lettuce-growing to be taken up more generally throughout the whole trucking region of eastern North Carolina.

CLIMATIC CONDITIONS DURING THE SEASON.

From the sowing of the seed for the first or fall crop until the removal of the last of the spring crop is a period of about eight and a half months, or from the middle of August to the first of May. During this period the weather conditions in the eastern counties of the State are quite mild. The temperature rarely drops below 15° F., while the rainfall, though somewhat irregular, averages 3.7 inches per month. The rainfall at New Bern during these months is considerably in excess of that at Wilmington, while the rainfall at Fayetteville is also slightly less than that at New Bern.

In the matter of temperature we are not concerned particularly with averages, but with the lowest temperature registered during the time the crop is growing. A careful compilation from the weather reports, made by Assistant Horticulturist F. C. Reimer, shows the following conditions during the past five years:

1901-2.

Month.	Wilmington.			New Bern.			Fayetteville.		
	Rainfall.	Lowest Temperature.	Times Below 28°.	Rainfall.	Lowest Temperature.	Times Below 28°.	Rainfall.	Lowest Temperature.	Times Below 28°.
September-----	<i>Inches.</i> 5.38	55	-----	<i>Inches.</i> 7.04	54	-----	<i>Inches.</i> 5.47	50	-----
October-----	2.69	43	-----	1.74	36	-----	1.21	34	-----
November-----	1.16	26	1	2.07	25	1	.73	18	9
December-----	4.72	16	8	5.18	15	7	5.34	10	13
January-----	1.39	21	6	2.09	18	10	2.20	15	11
February-----	3.29	23	6	2.00	2	-----	6.18	16	11
March-----	3.61	24	1	3.20	22	2	2.44	21	2
April-----	1.62	37	-----	2.49	32	-----	2.75	31	-----

1902-3.

September-----	3.57	55	-----	4.88	51	-----	5.25	45	-----
October-----	3.18	40	-----	3.99	37	-----	2.00	34	-----
November-----	3.83	33	-----	3.77	32	-----	3.28	29	-----
December-----	3.26	19	3	4.52	16	6	3.78	16	8
January-----	3.43	22	2	4.48	20	5	5.08	18	6
February-----	3.54	23	2	4.82	18	5	5.21	19	5
March-----	3.32	38	-----	5.20	36	-----	8.79	32	-----
April-----	2.05	35	-----	3.97	32	-----	7.99	30	-----

1903-4.

September-----	1.16	53	-----	1.04	46	-----	1.98	44	-----
October-----	2.46	37	-----	4.54	30	-----	4.98	30	-----
November-----	1.03	21	2	1.57	18	5	1.71	16	7
December-----	2.35	19	5	2.38	22	7	2.58	15	19
January-----	3.24	15	10	4.24	15	15	2.80	9	18
February-----	2.19	21	7	5.47	15	15	4.46	17	12
March-----	4.33	29	-----	4.38	27	1	3.89	27	-----
April-----	1.44	39	-----	1.65	30	-----	.53	28	-----

METHODS OF CULTURE.

According to location and climatic conditions, lettuce-growing in North Carolina is carried on under three different methods: (1) Steam-heated and irrigated frames; (2) Covered frames without heating; (3) Open field culture.

Lettuce-growing by heating and irrigation is, as regards the growing, a safe and sure business. It is also the most costly method to install. There is, however, no danger from a sudden drop in temperature, and the crop never need suffer from drought. This method puts on the market the early lettuce that nearly always brings the highest price. The history of steam lettuce-growing in North Carolina has shown that it is a very profitable business.

In warm southern locations, where cold snaps are only occasional, lettuce can be readily grown under protecting cotton covers, with no heat except that of the sun's rays. Lettuce is a cool-growing plant that will, when partially grown, bear even being frozen solid. In its succulent condition at heading time, however, it is very tender and is killed by freezing. This last winter (1906-'07) lettuce under experiment, growing in frames and without heat, was frozen solid three different times and showed no bad effects. Freezing at heading time, however, is always fatal. In this climate, where lettuce is grown under frames, there is very little danger of freezing at heading time. At times of freezing the frames are kept covered and the frost draws out so gradually that no bad effect is apparent. When lettuce is frozen great care should be taken to see that the covers are tightly stretched and do not touch or flap against the frozen plants. Whenever a plant is touched while frozen, it is ruined for market. Open field culture of lettuce is possible only in warm southern locations, where freezing is uncommon. It is, of course, more risky than the foregoing methods, but as the cost is trifling in comparison, one can afford to take some risk. This spring, owing to very favorable market conditions at the last of the lettuce season, field-grown lettuce brought the highest prices paid during the year, and the growers of field lettuce made phenomenal profits. A combination of the foregoing methods would lengthen out the lettuce shipping season and would be well worthy of trial by lettuce-growers. In addition to frame culture, it usually pays the southern grower to increase his acreage by the addition of some of the field-grown crop.

LETTUCE SOILS.

The quality of the lettuce crop is greatly influenced by the kind of soil upon which it is grown, and, while some soils are inferior for the work, their character may be changed to such a degree, by careful management, as to give satisfactory results.

The soils which may be used may be divided into three classes—light soils, heavy soils (*i. e.*, those containing a goodly amount of clay), and medium soils, of a loamy character.

Of the light soils it may be said that they warm up early in spring, give early crops and produce lettuce of delicate texture, but the heads are not so firm as those grown on heavier soil. These soils are benefited by large applications of stable manure, but after the applications the soils should be rolled or packed so as to render them more firm. Better results will thus be secured. Very light soils will not retain their fertility as well as heavy soils. Plant food is leached from them or carried away, beyond the reach of the plant roots, much more rapidly than in heavier soils. This difficulty can be lessened by incorporating a great deal of vegetable matter in them, either in the form of stable manure or supplied from a crop of cowpeas or some other legume grown on the soil and plowed under.

Clay lands, if very heavy, are not ideal for lettuce-growing. They do not warm up rapidly enough, the plants grow slowly, while the leaves become strong and fibrous, but the heads are firm, solid and hard. Soils inclined to be very heavy need large amounts of vegetable matter, quite as much as will be found necessary in light soils.

All things considered, the ideal soils for the development of the lettuce crop are those of the nature of sandy loam, resting on a clay subsoil, twelve or fifteen inches below the surface. Soils intermediate in character between the two mentioned above will yield good crops for the early market and at the same time retain their fertility. If properly managed, they will increase in fertility from year to year.

A soil retentive of moisture and plant food has a more or less impervious clay subsoil. No matter how suitable the surface portion, unless there be a firm clay bottom beneath it, the plant food on becoming soluble is quickly leached out and lost if it is not taken up by the crop. Deep, sandy soils, though quick in their action if constantly irrigated and fed, are nevertheless expensive in fertilizers and irrigation. If one is selecting a soil for lettuce-growing or, in fact, for any truck crop, it is well to look carefully into the nature and position of the subsoil.

At the Geneva experiment station soils of different compositions were used in growing lettuce in greenhouses. The following is a summary of the results of their work:

Tests of different soil mixtures for forcing head lettuce have been continued for three winters. A medium clay loam, with various proportions of stable manure and sand, pure sand with manure, and a very light sandy loam with manure, have been tried. The clay loam, with heavy application of stable manure, gave the best results. Light, sandy loam, with heavy application of stable manure, was least satisfactory. On pure sand, with a good dressing of stable manure, the lettuce made a vigorous growth, but the heads were less firm and the texture more delicate than with the lettuce which was grown on the clay loam.—*Bul. No. 146, New York Experiment Station, Geneva, N. Y.*

DRAINAGE.

Soils for lettuce-growing should be well drained. A wet soil is always cold and slow in plant growth. Lettuce, being normally a rapidly growing crop, does not do well on such a soil. When grown slowly, lettuce is bluish in color, fibrous in texture and bitter in flavor. There are some good lettuce soils which, owing to naturally favorable locations, do not require artificial drainage. Most trucking soils, however, are benefited by draining. The simplest method is by open ditches deep enough to lower the water table below the root range of the plants. If ditches do not need to be large, they may be cheaply and conveniently "blinded" by the use of poles, pine-tops and straw. Blind ditches, if properly made, will work well for many years. Undoubtedly the most efficient drains are those made of porous tile. Laterals should be 3 inches in diameter, 40 feet to 80 feet apart and 3 feet to 4 feet in depth, according to the nature of the land. To quickly carry off heavy showers, it is usual to have shallow furrows between beds. In the open field the ground is laid off in narrow lands.

HUMUS A NECESSITY IN LETTUCE CULTURE.

In common with all quick-growing crops, lettuce requires a large amount of humus in the soil. Experiments in this line during the past two seasons have proved conclusively that lettuce cannot be grown successfully on land deficient in humus. On two beds of old, worn soil included in the experiment, very few good heads were obtained. The plants grew slowly, showed a bluish color and were tough and bitter. Other beds on the same worn soil, with large additions of manure and vegetable matter, gave most excellent results. Barn-yard manure is one of the best and surest means of adding humus to soils, but unfortunately in our trucking regions it is too scarce and high-priced. The cheapest means of adding organic matter to soils is by the use of cover crops. Any quick-growing plant that produces a considerable amount of vegetable tissue may be used as a cover or green manuring crop, but of all the plants used for this purpose there are none equal to the legumes or pod-bearers. All legumes, besides adding to the soil the organic matter in their tissues, have the power of bearing upon their roots the nodules in which bacteria store up nitrogen from the atmosphere. The nitrogen procured in this way is clear gain. Peas, beans, vetches, clover and cow-peas may all be used for this purpose. For soil improvement in eastern North Carolina there is nothing equal to the cowpea. Lettuce-growers should see to it that whenever their lettuce soils are not under crop they should be storing humus and nitrogen from a crop of cow-peas.

Humus can also be supplied by means of street sweepings, swamp muck or even peat or turf from wild lands. But in any case it may be set down as a proverb in lettuce culture that **WHERE NO HUMUS IS THERE IS NO LETTUCE.**

PREPARATION OF LETTUCE SOILS.

Lettuce land, which during the summer should be under a heavy crop of cowpeas, should be given a heavy dressing of manure or compost and plowed during the cool weather of early fall. Plowing should be deep, not less than 6 inches, but should not bring up at a single plowing too much raw soil. The early turning down of the cowpeas and manure gives them a chance to decompose, so that they can be thoroughly mixed with the soil. The surface should be kept loose by harrowing, so as to retain moisture. An occasional working with a disc or cut-a-way harrow will help to break up the organic matter and incorporate it with the soil. Before setting out the plants, the soil should be plowed again and thoroughly worked down and leveled. The final touches in cultivation are given with a garden rake. This removes all coarse and undecayed materials and leaves the surface very smooth for marking.

Where well-rotted manure can be obtained, another method we have found even better is to top-dress the land with the manure after frost has killed the cowpea vines. The vines may then be cut up and incorporated with the soil by repeated workings with a disc or cut-a-way harrow. This leaves the vegetable matter nearer the surface of the soil, where it is most needed. After the soil is raked and compacted it is ready for setting.

THE SEED-BED.

For the first or early crop of lettuce, which is to go to market from December 1st to Christmas, the seed is sown from August 15th to September 1st and the plants set out from September 15th to October 10th. For the winter crop, which goes to market in March and April, the seed is sown from October 1st to 15th and the plants set from November 15th to December 15th. Since the weather is always mild at seed-planting time, we have found it best to sow the seed in the open. This gives firmer, hardier plants for transplanting than those grown under covers or sash. The seed-bed is prepared in much the same manner as the soil in the lettuce frames or in the field, except that it requires less manure. The land for the bed is somewhat elevated or crowned up, so that all surface water drains off. Its surface should be thoroughly pulverized, firmed and raked off. The seed is best sown broadcast and raked lightly into the soil. It takes about two to three pounds of seed to produce the plants for setting an acre. Until the plants come up, it is a good plan to cover

the bed with canvas or sash to retain moisture. Only the best seed should be sown, no matter what its cost. It pays to test the seed. If the weather be very dry, the beds may need an occasional sprinkling.

SETTING THE PLANTS.

Plants are ready to transplant from the seed-bed at from four to six weeks after seed-sowing. At that time the little plants will be about three inches high and will be getting the fourth leaf. Very small plants are difficult to handle in setting. The larger plants are taken from the beds first, and the smaller ones then get more room and come on for later plantings. For large head-lettuce the plants are set about 10 by 10 inches or 10 by 12 inches. Many home-made devices are used for conveniently marking off the beds. In our experimental plantings we use a light marking strip, which in length corresponds with the width of the bed. At each end of this a strip 10 inches long is tacked at right-angles to it. This spaces the new row from the last one set. Notches are cut on the marking strip 10 inches apart. The planters kneel on a board and set a plant in every notch of the marking strip. As the setting proceeds, the board and marker are moved backward. The board firms the soil and is a guard against the plants being set too deeply. After the beds are set they should be shaded with the covers for two or three days.

GENERAL CULTIVATION AND MANAGEMENT.

Since the soil for lettuce is given such thorough preparation and fertilization, and since in heated and irrigated frames growing conditions are almost entirely under control, very little cultivation of lettuce beds is necessary. Cultivation is usually to render plant food available and to retain moisture or kill weeds. The previous preparation, together with necessary irrigation, pretty nearly satisfy these needs. However, till the leaves begin to spread out over the ground, an occasional raking may be given with a narrow home-made rake that can go between the plants without disturbing the leaves. About three or four weeks after the plants are set, when they have gotten hold of the soil and are starting into active growth, the second application of commercial fertilizer should be given. A light raking should be given at that time to incorporate the fertilizer with the soil. After the leaves cover the ground all cultivation should cease. Unless the weather is cold or threatening, the covers should be removed during the day and the beds given all available sunshine. It is not necessary to cover the beds at night unless the temperature is low and frost imminent. If the covers are kept too close it keeps the air moist and encourages disease.

FERTILIZERS.

As has been said before, humus or organic matter is the basis of successful lettuce culture. Any or all of the available sources of organic matter, such as manure, compost, muck, peat or cover crops, should be used to make lettuce soils rich in humus. The additional ingredients necessary can be most cheaply supplied from the commercial fertilizer sack. Sufficient nitrogen is necessary to encourage a rapid leaf growth. An excess of nitrogen will make a soft, loose head that does not ship well. Phosphoric acid and potash seem to add the firmness to the heads necessary to make them carry well to market. A good formula for lettuce is:

4 per cent nitrogen,	} 1,500 to 2,000 pounds per acre.
7 per cent phosphoric acid,	
8 per cent potash,	

This formula might appear to be low in nitrogen. It is found cheapest, however, to apply nitrogen by the use of a leguminous crop growing on the land during the summer. As nitrogen is the fertilizing constituent most readily lost from the soil, it should not be applied in large quantities till the crop is in a sufficiently growing condition to quickly take it up. For this reason, and also that the previous cover crop of cowpeas has added considerable nitrogen, this most expensive fertilizing constituent in the formula is reduced. After the crop is in vigorous growing condition, 100 to 150 pounds of nitrate of soda may be applied as a top dressing and raked in between the plants.

With the proper use of summer leguminous crops, 1,500 to 2,000 pounds of the above mixture will be found sufficient. Half of this should be sown broadcast on the land and harrowed in a week or two before the plants are set. The other half should be raked in between the plants three to four weeks after setting.

Most truckers find it cheapest to buy the raw fertilizing materials that offer best on the market, and to make their own mixtures according to percentage desired, rather than to buy ready-made fertilizers.

HARVESTING.

Lettuce should be cut and packed only when dry. The plants are cut close to the ground and the outer leaves removed. Though all the plants in a bed may be planted the same day, it will be found that there is a great deal of difference in the time of their heading. In cutting it will be found necessary to go over the beds several times. Lettuce should be carefully graded. This is easily done by selecting and cutting at one shipment only those heads that are firm and up to size. A day or two later the same bed will give another crop of just

as large solid heads. The baskets used in shipping lettuce are the cone-shaped veneer baskets, half-barrel size. This basket should, when well packed, contain twenty-five heads of first-class lettuce. The usual market run is thirty to forty heads per basket. In filling the baskets the bottom row should be placed leaves up. The other courses should be placed leaves down. Figure 3 shows a well-packed basket, ready for heading. The baskets should be tightly packed, as there will be more or less shrinkage from drying during shipment to market.

Manufacturers of paper are now making special liners and caps for truck baskets. These are of heavy paper, cut to fit closely to sides and cover. They cost about \$25 per thousand for the half-barrel size. We have not yet had an opportunity of trying liners for lettuce baskets, but believe they would materially assist in putting lettuce in the market in good, fresh condition.

Market records for the last three years show that the fall crop of North Carolina lettuce goes to market from December 15th to January 1st, and brings \$1 to \$2.50 per half-barrel basket. Spring lettuce goes forward from March 1st to April 20th, and brings \$1.50 to \$4.50. Good lettuce will yield from 800 to 1,000 baskets per acre.

Lettuce has proven to be the best-paying truck crop in eastern North Carolina. With steam-heated and irrigated beds, a lettuce crop will bring \$1,000 to \$1,500 per acre. Those best informed say that the heated and irrigated beds have always paid good dividends. Truckers admit that it is the lettuce crop that makes up their losses on other ventures.

ROTATIONS.

Lettuce is a rapid-growing plant, maturing in from seventy to ninety days from the time of setting. Its short season thus fits it well for rotating with other truck crops. Since the outfit for lettuce-growing is more or less expensive, it is desirable to use it only for intensive, quick-growing, high-profit crops. Cucumbers, eggplant, cantaloupes, beets, radishes and beans may be grown in the frames in winter and spring and fit in nicely with lettuce. The following few rotations give examples of the many combinations of crops that may be used with lettuce:

Rotation for Frames.—

1. LettuceSeptember to December.
2. BeetsJanuary to April.
3. CucumbersApril to July.
4. CowpeasJuly to September.

1. LettuceDecember to March.
2. CucumbersMarch to July.
3. CowpeasJuly to October.

1. LettuceSeptember to December.
2. RadishFebruary to March.
3. BeansMarch to June.
4. CowpeasJune to September.

1. LettuceDecember to March.
2. EggplantMarch to June.
3. CowpeasJuly to November.

Rotation for Field.—

1. LettuceDecember to March.
2. PotatoesMarch to June.
3. CornJune to October.
4. CowpeasSowed at "laying-by" of corn.

1. LettuceDecember to March.
2. CantaloupesMarch to July.
3. CowpeasJuly to October.

1. LettuceDecember to March.
2. TomatoesMarch to July.
3. CowpeasJuly to October.

It will be noticed that cowpeas find a place in each of these rotations. The cowpea crop is the cheap method of supplying vegetable matter and nitrogen for successive lettuce crops.

With a proper rotation, including cover crops and care in avoiding disease, it is possible to grow lettuce on the same land year after year.

DISEASES.

Owing to dryness of the air, sunlight and better ventilation, winter lettuce in North Carolina is not affected by the many diseases to which the crop is usually subject where grown under greenhouse culture. There is, however, one disease which, even under these conditions, proves quite destructive. This is commonly known as lettuce "drop," "damp," or "wilt." This disease is caused by the action of a minute parasitic fungous plant that grows and thrives in the tissue of the lettuce plant. The disease spreads by means of small, dark bodies known as sclerotia, varying from the size of a flaxseed to that of a wheat grain. These lie in the soil and carry the disease over from crop to crop. The plant becomes infected when small, and the disease grows, hidden in its tissues, till about the time of heading, when the whole plant drops down in a single night. On examination

the whole plant—root, stem and leaves—and even the soil, will be found covered with a mass of fine cottony fibres. In a week or ten days after the plant wilts the sclerotia or reproductive bodies of the fungus will have formed in the dead plant and soil. These lie in the ground and carry over the trouble for the next crop. Each affected plant should be removed, therefore, before it forms its sclerotia and infects the soil. As a protection to succeeding crops, it pays to go over the bed regularly and remove all diseased plants as soon as the wilting is noticeable. It is found that the sclerotia spread the disease by throwing their spores on to the under side of the leaves. In future experimental work it is intended to try the effect of mulches in protecting the plants from infection.

VARIETIES OF LETTUCE.

There are more than one hundred distinct varieties of lettuce listed in America; of these, only the heading varieties are at present much in demand. Loose lettuce, though of fine quality, does not ship well and is little grown except in a local way. For winter lettuce-growing the Big Boston variety seems to so well fill all requirements that it is at present the leading commercial lettuce.

FRAMES.

Frames for winter lettuce-growing may be of any desired width and length to suit the land to be used, but convenience seems to have fixed their width into two standard sizes, viz., 16 feet for wide or double frames and 9 feet for narrow or single ones. Three feet is found to be a suitable width for passageways between the frames. From this it can be seen that with the narrow frames one-fourth of the area is used in walks, and with the wide ones a little less than one-sixth. For convenience in heating and irrigating lettuce and in removing covers, frames are usually made about one hundred feet long. Wide frames are best adapted to warm locations and are often used with canvas covers, but without heating-pipes. The narrow beds are specially adapted to steam-heating and forcing. On our Truck Test Farm the frames are made 17 feet $4\frac{3}{4}$ inches by 104 feet $3\frac{3}{4}$ inches, so as to include one twenty-fourth of an acre. This makes them convenient in estimating yields and profits. The ends of the frames are removable and are taken out when the beds are being prepared for setting, so that horse cultivation can be given. The rafters which support the cotton covers are 4 feet apart in wide frames and 6 feet in narrow ones, and are also removable. Undressed inch lumber 12 inches wide is used for construction of the frames. (See Plans 1 and 2.)

COVERS.

The cotton cloth used for covering frames for winter lettuce-growing must be sufficiently white and thin to admit light to the plants in bad weather, yet strong and heavy enough to be durable and to stand stretching. What is known as "Heavy Domestic," running 3 yards to the pound, is found to best satisfy these requirements. This cloth is 30 inches wide and costs about 8 cents per yard. Exclusive of walks it takes approximately 4,300 yards to cover an acre. At 8 cents per yard the cost of covering an acre would be \$344. This is one of the most expensive features of lettuce culture in frames.

Methods of Fastening Covers.—Covers last longer where they are entirely detachable from the frames, but in cold weather it is found that the heat can better be retained if the covers are securely tacked or slatted to the rear of the beds. There are various devices in use for fastening down the edges of the covers. A simple and common method is to sew straps or loops of cloth to the edges of the cover every 4 feet and to hook these over wire nails driven in the outside of the frame. Small brass rings may be substituted for the cloth loops. Still another method is to tie a marble or small pebble into the edge of the cloth with fishermen's heavy seine twine and to loop the cord over a wire nail. These methods have the disadvantage that with the warping of the frames and the shrinking of the covers it is often difficult to make loop and nail meet. The most satisfactory method we have yet tried for fastening covers is the turning of a narrow hem on the edge of the cover and threading through this a $\frac{3}{8}$ -inch rope. This rope may be quickly fastened down, no matter what the position of the nail, and it holds the cover securely. The rope is also a great protection to the covers when the beds are being exposed daily. Without the rope we have found that in uncovering long beds the covers are apt to be ripped and torn by the men pulling them in too long stretches. Rope $\frac{3}{8}$ -inch size costs about 12 cents and runs about 24 feet per pound. For narrow frames it would require about 3,600 feet of rope per acre, the cost of which would be \$18, and for wide ones \$14. With short lengths covers are sometimes handled on rollers. This keeps the cloth in good condition and the weight of the roller holds the cloth taut and secure in windy weather. Rollers, however, are difficult to handle on long beds, and for that reason have never come into general use.

With good care covers should last three or four years. Oiling the covers was found to destroy their elasticity and cause them to crack and break. White-washing the covers, as sailors do their canvas, would undoubtedly destroy fungous rots and lengthen the time of usefulness of the cloth. When not in use the covers should be folded up when dried and stored in a dry loft.

USE OF SASH.

Glazed sash may also be used in winter lettuce culture, but they have never come into common use. This is doubtless due to their increased cost over cotton covers and their being fragile and also cumbersome to handle. It is also more difficult to irrigate glass-covered frames than those on which the cotton covers may be quickly and easily reefed. Sash-covered frames, however, maintain a higher and more even temperature in cool weather than cotton-covered frames and bring the crop more quickly to maturity. They also require constant attention regarding ventilation during bright weather. It may be, considering the earliness gained by the use of sash and their greater durability in comparison with canvas, that glass is in the long run the most economical and profitable. This point will be tested in future experiments at the State Truck Test Farm.

Sash for forcing purposes are made in the regulation size, 3 by 6 feet, and cost about \$3 apiece glazed. The frames would be 11 feet wide and had best run north and south, to get the sun on both slopes of the sash. Single-sash beds are best facing the south.

HEATING.

For winter lettuce-growing in the mild climate of eastern North Carolina a heating plant is not an absolute necessity, as there are few days when the temperature falls below freezing, but it pays to have a heating system ready to guard against cold snaps and freezes. The supplementing of the natural daily sun's rays with accessory heat makes winter lettuce-growing a very sure thing. The additional heat also helps to keep the lettuce growing in cool weather and brings it in for the higher prices of the early market. The history of lettuce-growing in North Carolina has proven that steam lettuce-growing has been the surest and most profitable method. The steam capacity required per acre for heating and also for irrigating is about 8 to 10 horse-power.

Piping.—The main heating-pipes will vary in size from 4 inches down, according to the acreage to be covered. Lateral heating-pipes should be 1 inch in diameter. The method of piping lettuce frames is simple. It is usually a straight main, with a 1-inch lateral running off it at right-angles into each bed. It is not necessary to have a circulation, but simply a straight push of steam with an exhaust at the end. We find, however, that with an exhaust for each frame it is very expensive of steam, and that it is better to couple the rear ends of the pipes in every five or six frames into a common pipe and make one exhaust for the whole. This is found to be sufficient exhaust to allow for condensation and to keep the system working and the temperature fairly uniform throughout. Just a slight exhaust of steam is found to be all that is necessary to keep the steam moving

sufficiently. On first installing our heating system we used $\frac{3}{8}$ -inch pet-cocks for exhausts, but soon found them to be constantly plugging up with scale and other foreign substances. After replacing them with $\frac{1}{2}$ -inch globe valves there was no trouble. The globe valves can be readily opened and all scale and condensation water blown out occasionally. Half-inch globe valves were found to answer as well for exhausts as the inch size, so reducers were put in and considerable saving in cost effected on the whole system. In lettuce heating, as in all long stretches of pipe, expansion joints have to be put in at intervals to allow for expansion and contraction.

In wide frames the heating-pipe is run down the centre of the bed and stapled to the centre posts sustaining the ribs for the cover. For heating purposes the narrow beds seem to give best results. The lettuce at the rear or high portion of the frame matures first, so the pipe is placed 3 feet from the lower edge of the frame. This equalizes the heat throughout the frame, as the heat rises to the cover and passes up to the higher portion at the rear of the bed. In wide frames there does not seem to be as good a circulation or distribution of heat. Wide frames have proven to be best for raising lettuce without heat.

IRRIGATING.

In winter lettuce-growing in eastern North Carolina irrigation is not a necessity, but with high-value crops and intensive cultivation it does not pay to wait for nature's showers. To keep such crops growing rapidly for the higher prices of the early market it pays to have facilities for supplementing the natural rainfall. In the arid regions of the West, where lack of rain is constant and continuous during the growing season, necessarily expensive systems must be installed. Under our eastern conditions irrigation is only supplemental and consequently must not be too expensive. In lettuce-growing the irrigating system may be combined with the heating system and its cost thereby reduced. The boiler that provides the steam for heating can also furnish steam for pumping.

Where water can be obtained from artesian wells, open furrow irrigation is the simplest and cheapest method. It is only in exceptional localities that such natural facilities are obtainable. In most localities irrigation water must be applied through pipes. The simplest and cheapest irrigation system is that which uses the heating-pipes for supplying the water. At intervals of about 20 feet along the heating-pipes, upright pipes, 4 feet in length, are attached. From the ends of these uprights the water is distributed by rose nozzles. This system, though simple and comparatively inexpensive, has not given as good results as where the water is applied as a spray from separate overhead pipes. This latter is known as the Skinner method, and is now most commonly in use by lettuce-growers. Large

mains are laid on the ground to conduct the water from the point of supply to the field where it is to be applied. From the ground main, connections are put in, elevating the laterals about six feet above the beds. The lateral pipes are run in lines down the alleyways between the beds. One pipe will irrigate two beds. The pipes are supported on 4 by 4 inch scantlings, notched at the top to hold the pipes in place. Small brass spray nipples are screwed into the lateral pipes at 4-foot intervals. Mr. Skinner gives the following directions for the location and size of pipes for laterals: "The pipes used are ordinary water pipes (the galvanized is best), which may vary in size from $\frac{1}{2}$ inch to $1\frac{1}{2}$ inches, according to the length of the lines intended to be used. For lines 600 feet long we have found it best to use $1\frac{1}{2}$ -inch size for one-third the length of the line, beginning at the feed-pipe end, one-third $1\frac{1}{4}$ -inch pipe, 100 feet 1-inch pipe, 60 feet $\frac{3}{4}$ -inch pipe and 40 feet of $\frac{1}{2}$ -inch size. This will give a uniform spray the entire length of the line." The smaller sizes of pipe give as good results in distributing the water and, of course, materially reduce the cost of the system. Where each distributing pipe is connected with the supply pipe is a globe valve, a loose joint and a lever for directing the spray. By means of the valve a bed may be sprayed or not at will. By turning the lever slightly the loose joint allows the whole length of pipe with its line of nozzles to be turned so as to direct the spray as desired on either bed. Figs. 6 and 7 show the valve, lever and loose-joint connection.

To operate successfully the Skinner irrigation system, there must be an ample supply of water, with sufficient pump capacity and steam pressure to force it from the nozzles into a fine spray. In time of drought there should be a supply of at least 6,000 gallons per acre per day. To supply the necessary power for irrigating, one should figure on from 8 to 10 horse-power boiler capacity per acre. Irrigation water is best applied at night.

Some growers make use of their irrigation systems for the application of insecticides, fungicides and fertilizers taken into solution.

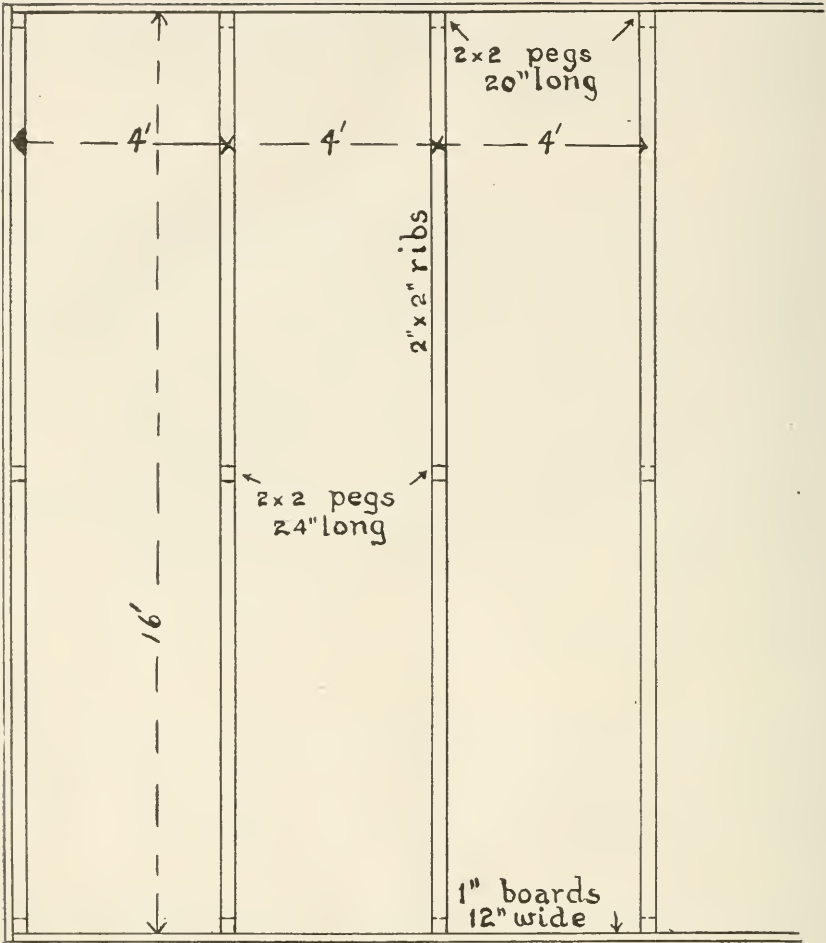
WATER SUPPLY.

For boiler purposes an abundant supply of clean, soft water is desirable. In some localities this is not always obtainable. Surface water, though usually soft, often fouls a boiler with mud. In most rivers, lakes, creeks, ponds and other sources of soft-water supply this difficulty is easily avoided by proper location and screening of the intake. In deep-water supply the kinds and varying degrees of hardness offer objections for boiler purposes that are much more difficult to remove than those of soft or surface water. For all purposes the soft water of rivers or lakes is usually the most suitable. Where

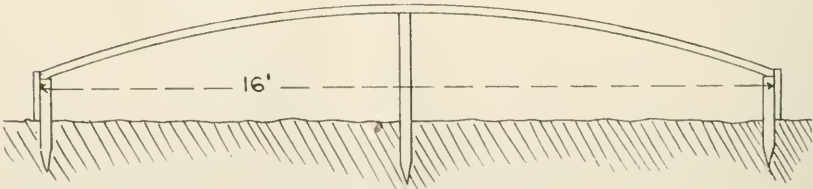
the water of deep wells has to be used, lime or marl conditions, if not too extreme, can be overcome by the use of petroleum or other boiler purges and frequent blowing out. By submitting samples to the State water analyst the value of any water for boiler or other purposes may be ascertained.

CONCLUSION.

North Carolina, with her mild climate, her light, loamy, early soils, and her excellent transportation facilities, has become one of the foremost trucking States in the Union. She is known in the large cities of the North as a wholesale producer of all kinds of vegetables. Market reports show, in addition, that she is a special producer of first-class lettuce. The history of the trucking industry in the State shows that lettuce is, per acre, the most intensive and best-paying truck crop. From the demand for North Carolina lettuce, as evidenced by the price received, it is apparent that the industry is capable of much greater development at very profitable prices. Undoubtedly one of the best horticultural investments in this State is the utilization of cheap lands contiguous to transportation lines for the wholesale production of fall and winter lettuce.



Ground Plan of Wide Frame.



Plan 1.

End Elevation of Wide Frame.

MATERIALS REQUIRED FOR WIDE OR DOUBLE FRAMES.

Sides, ends, rafters, posts.

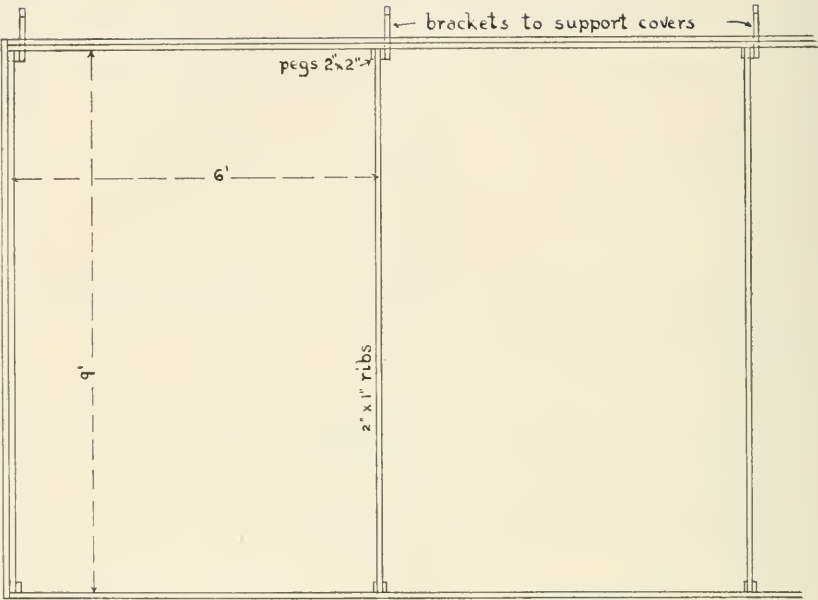
Estimating 23 frames, 100 feet long, per acre.

	Board Feet.
Front and back, 200 (12 inches by 1 inch).....	200
Ends, 2 (12 inches by 1 inch by 16 feet).....	32
Rafters, 24 (2 inches by 2 inches by 17 feet).....	136
Posts, 54 (2 inches by 2 inches by 20 inches).....	30
Posts, 24 (2 inches by 2 inches by 24 inches).....	16
Total per frame.....	414

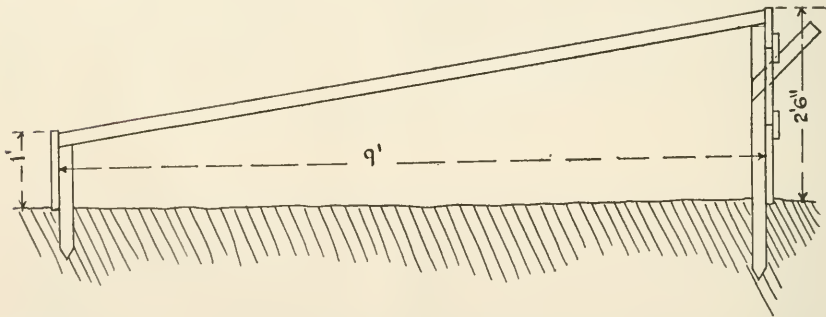
23 by 414 feet equals 9,522, or approximately 10 M board feet per acre.

Estimating this material at \$20 per M board feet, the wide frames would cost in the neighborhood of \$200 per acre.

The sides and ends would be of clear heart pine, undressed, and the posts and rafters of hard wood, undressed, preferably of oak.



Ground Plan of Narrow Frame.



Plan 2.

End Elevation of Narrow Frame.

MATERIALS REQUIRED FOR SINGLE OR NARROW FRAMES.

Sides, ends, rafters, posts.

Estimating 36 frames, 100 feet long, per acre.

	Board Feet.
Front, 100 (12 inches by 1 inch)	100
Back, 200 (12 inches by 1 inch)	200
Back, 100 (6 inches by 1 inch)	50
Back, 200 (3 inches by 1 inch)	50
Ends, 2 (12 inches by 1 inch by 9 feet)	18
Back, 2 (9 inches by 1 inch by 9 feet)	14
Rafters, 17 (2 inches by 1 inch by 9 feet)	25
Posts, 17 (2 inches by 2 inches by 40 inches)	19
Posts, 17 (2 inches by 2 inches by 20 inches)	10
Total per frame	486

36 by 486 feet equals 17,496 board feet per acre.

At \$20 per M board feet, the narrow frames would cost approximately \$350 per acre.

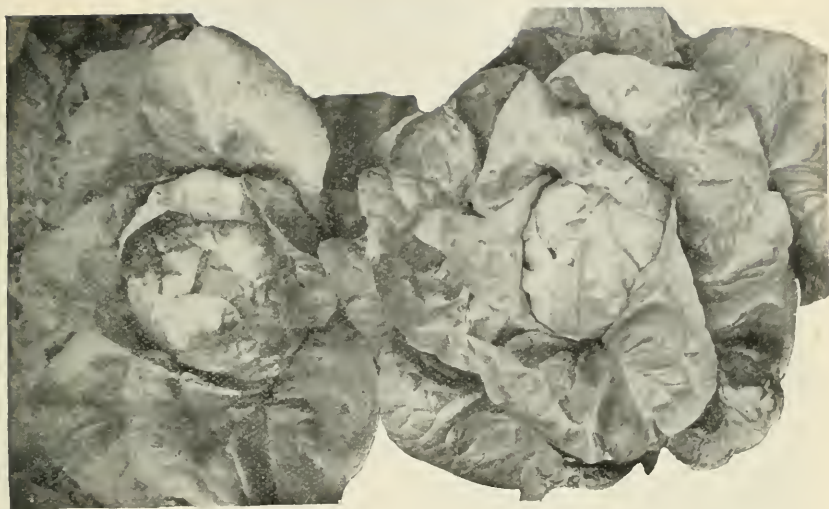


Fig. 1. Well-grown heads in bed before cutting. One-fourth natural size.

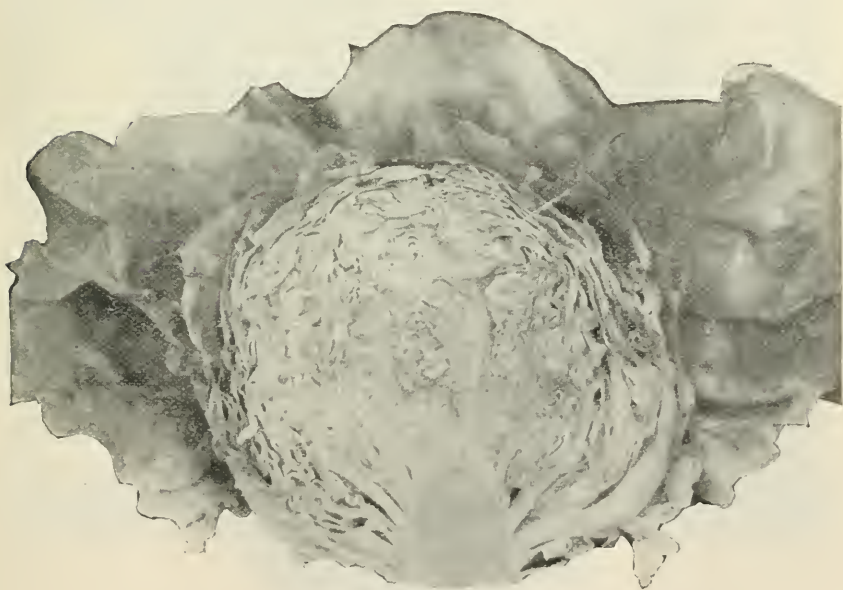


Fig. 2. Cross-section of well-grown head of Big Boston Lettuce.

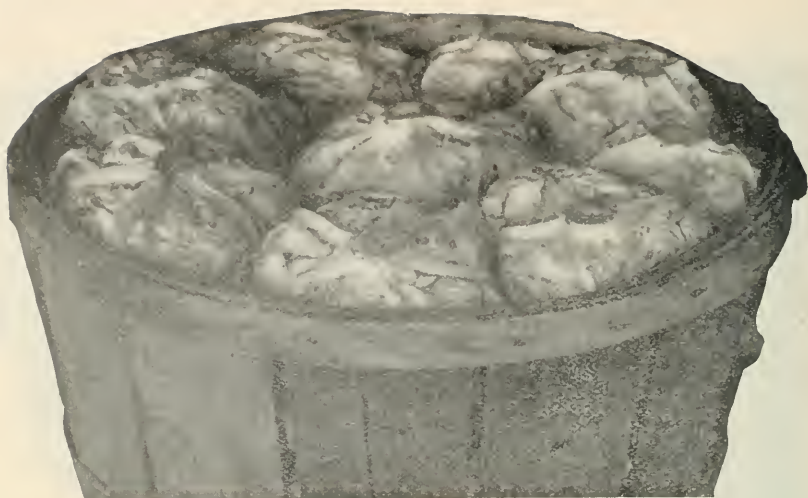


Fig. 3. Properly packed basket ready for cover.



Fig. 4. Lettuce packed ready for shipment.

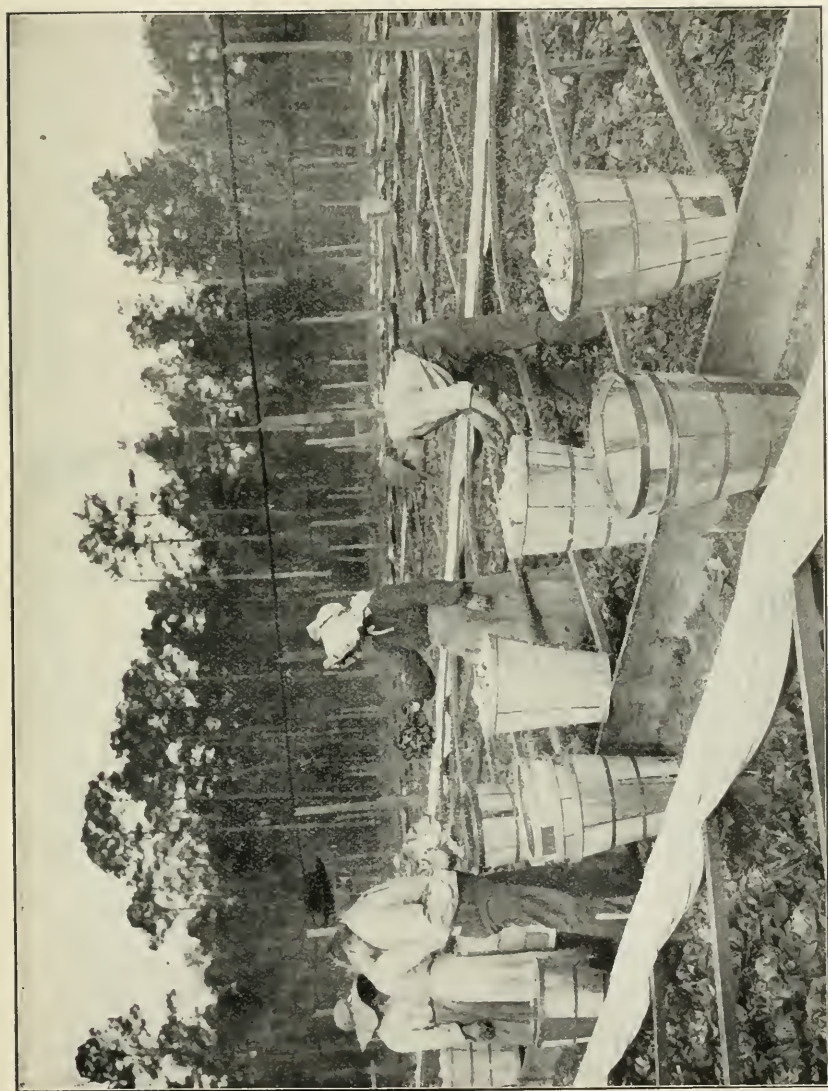


Fig. 5. Cutting and packing Lettuce. Truck Test Farm, Fender County, N. C.



Fig. 6. Main irrigating pipe with lateral connections, showing cut-off valve, lever and slip joint.

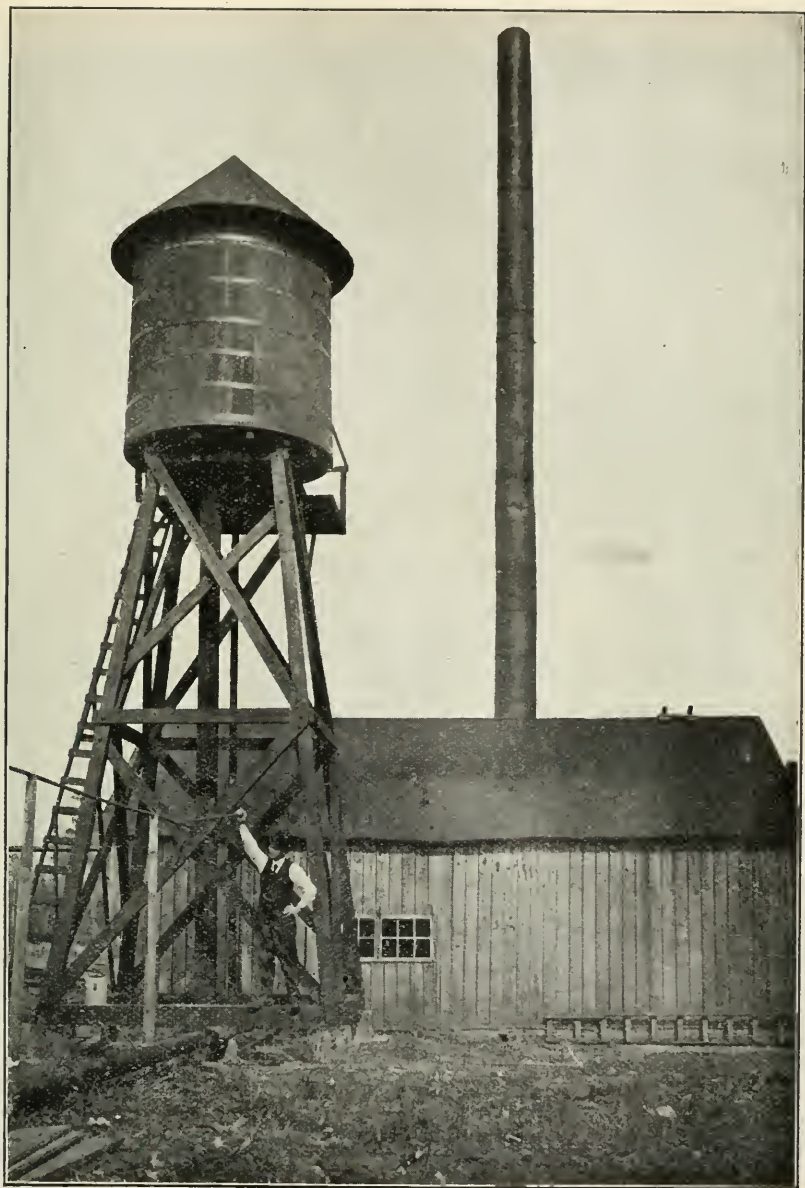


Fig. 7. Engine house and supply tank, showing lever for directing spray from lateral irrigation pipe.



Fig. 8. Steam Lettuce-growing. New Bern, N. C.



Fig. 9. Shipping Lettuce. New Bern, N. C.

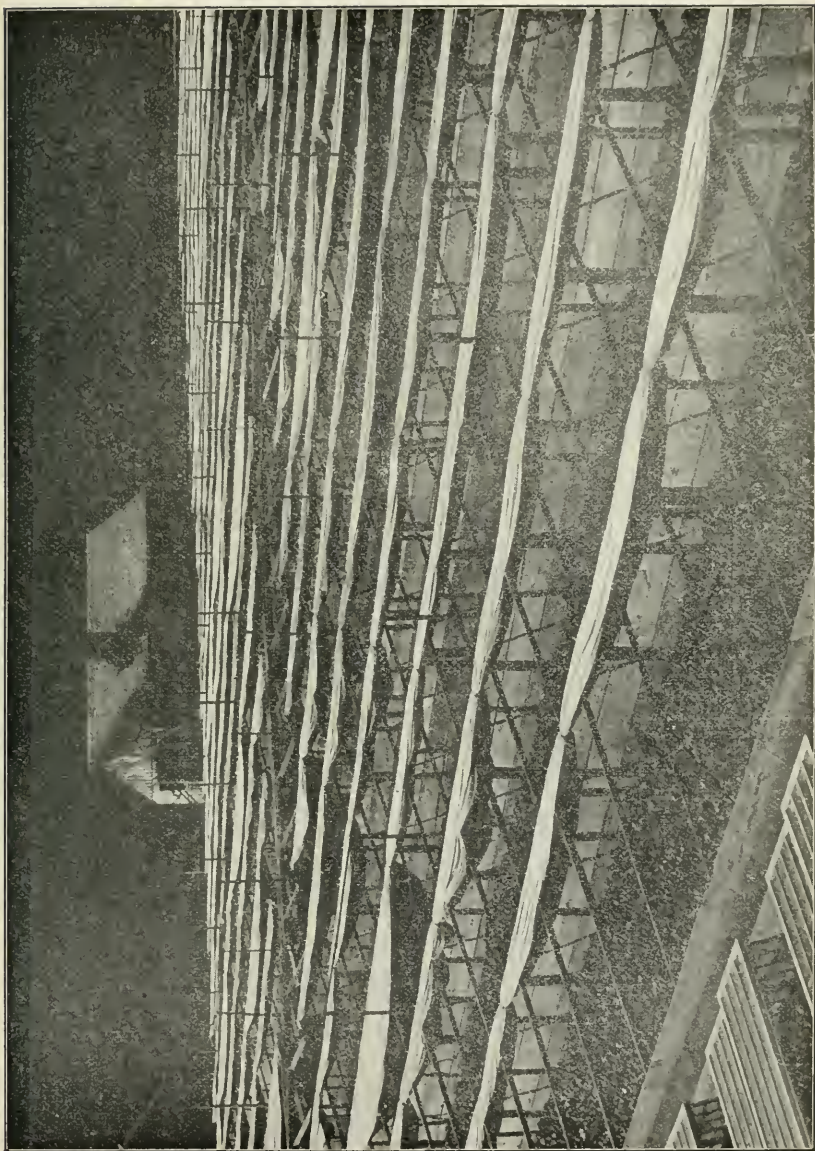


Fig. 10. Narrow frames with steam heat. New Bern, N. C.

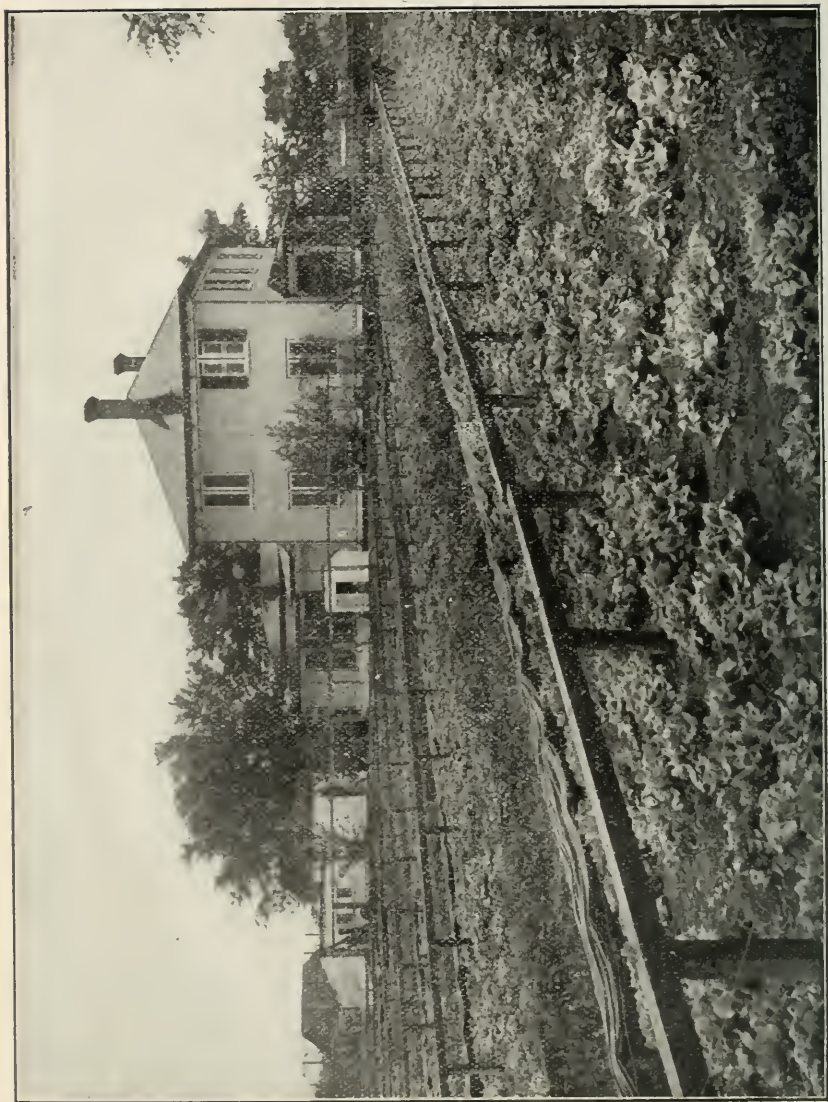


Fig. 11. Lettuce growing in city lot. Fayetteville, N. C.

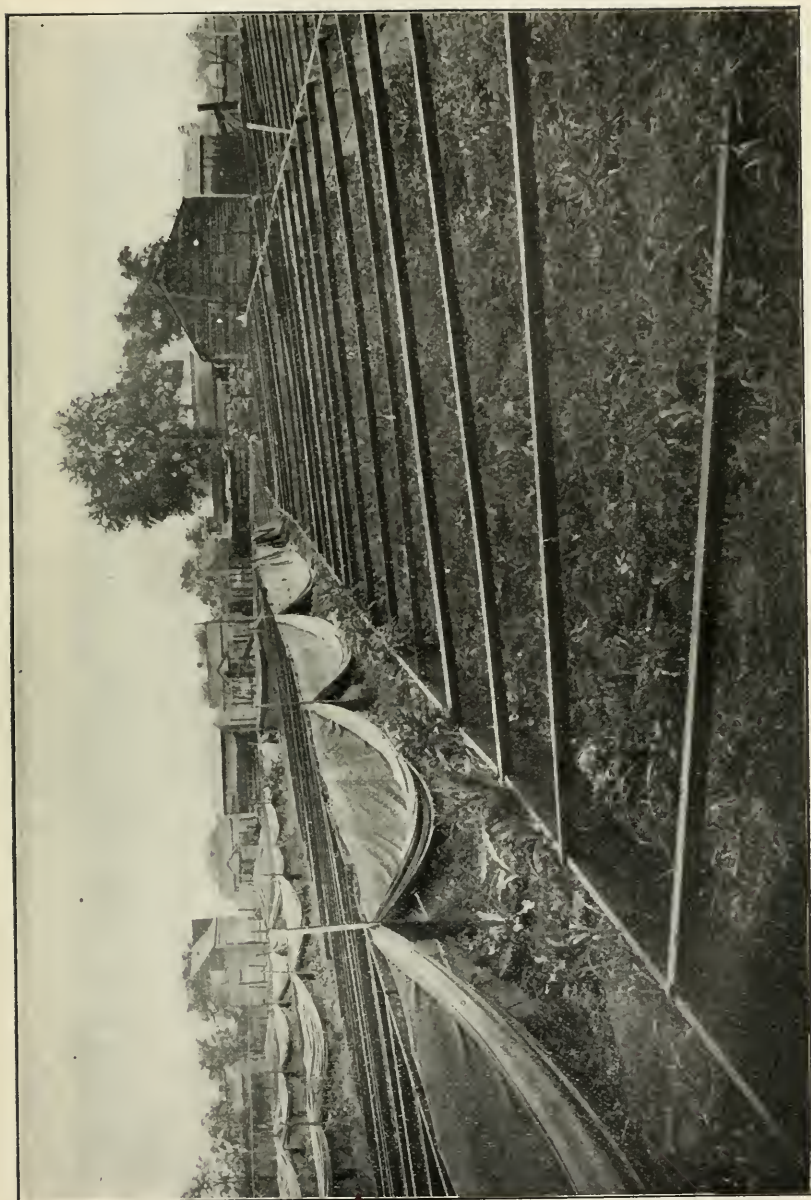


Fig. 12. Lettuce frames on small suburban place, Fayetteville, N. C.

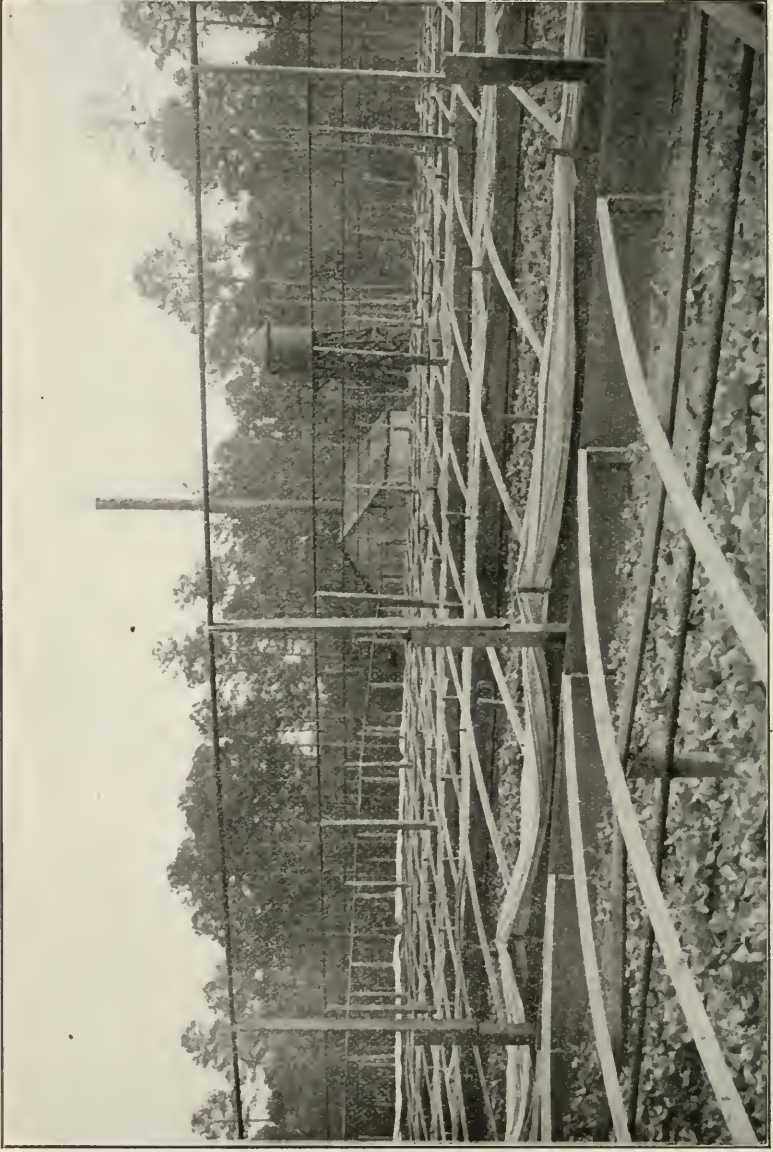


Fig. 13. Lettuce culture in wide frames, showing heating and irrigating pipes. Truck Test Farm, Pender County, N. C.

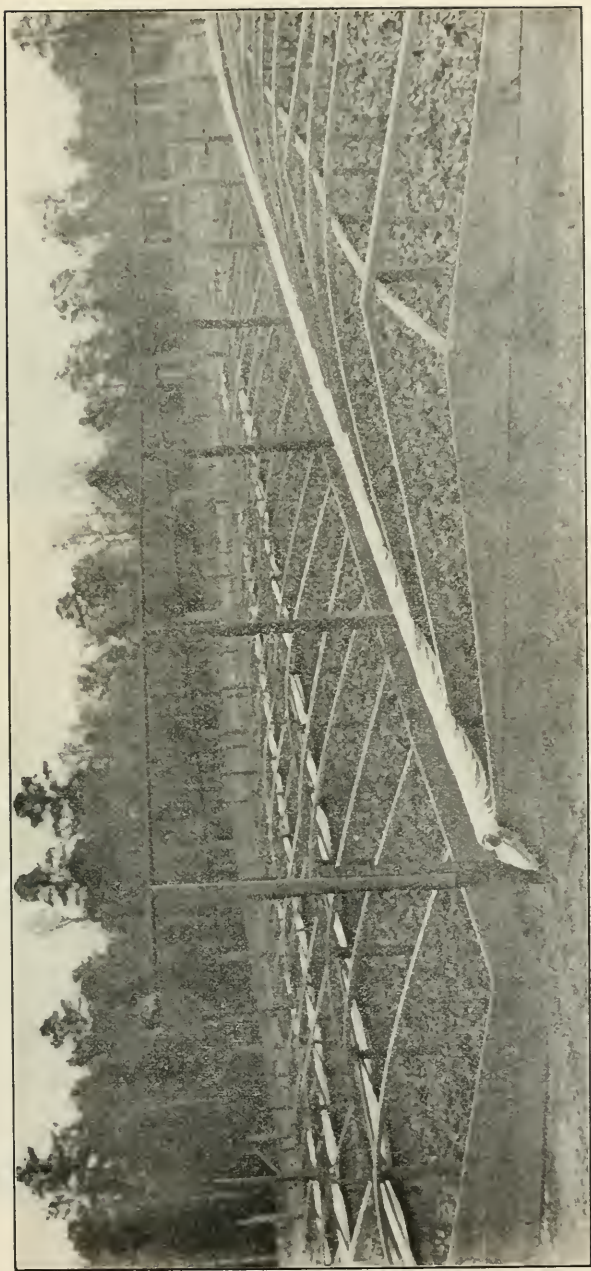


Fig. 14. Lettuce growing in wide frames under Skinner irrigation system. Covers reeved to admit sunlight. Truck Test Farm, Pender County, N. C.



Fig. 15. Lettuce in wide frames without heat. Wilmington, N. C.



Fig. 16. Lettuce in narrow frames without heat and irrigation. Wilmington, N. C.

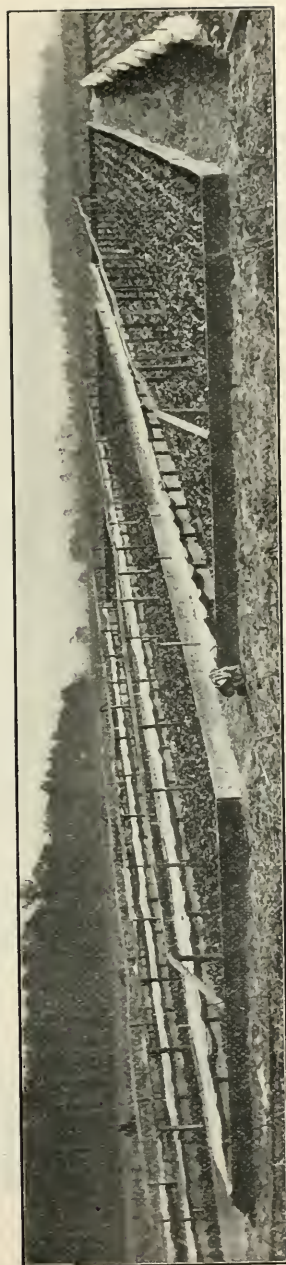


Fig. 17. Wide frames without heat. Wilmington, N. C.

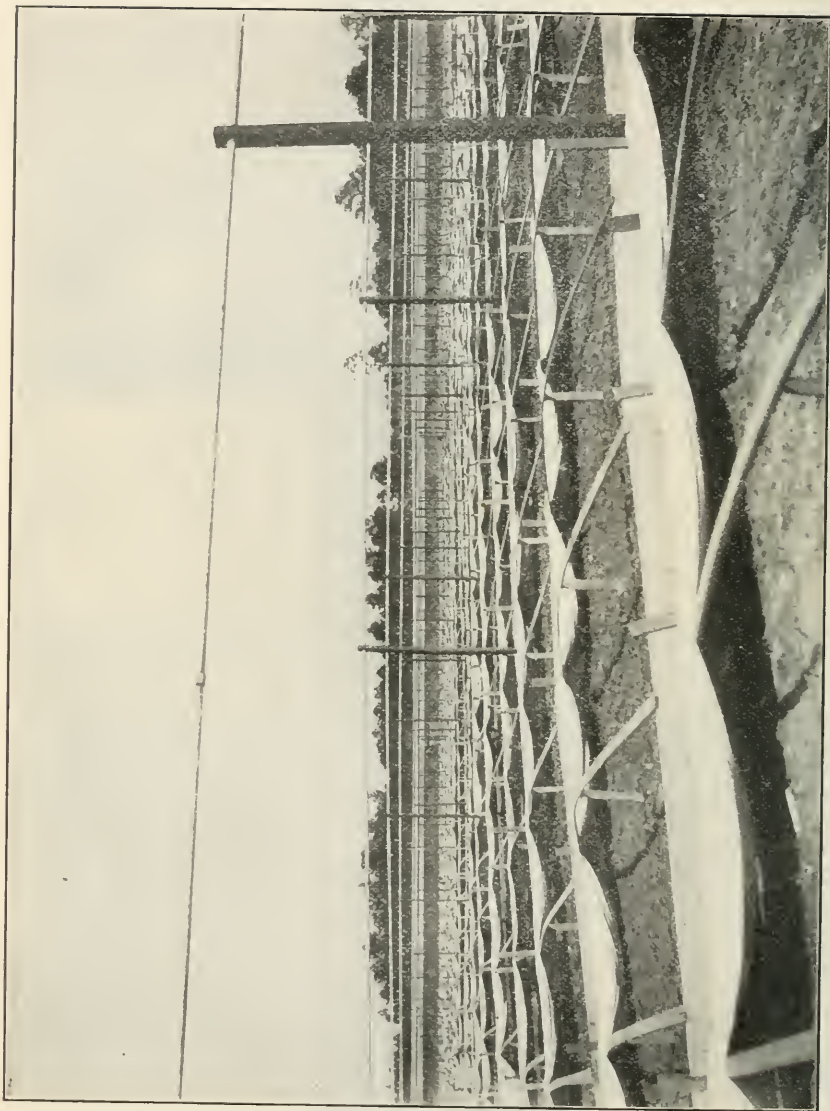


Fig. 18. Lettuce frames with overhead irrigation but without heating pipes. Wilmington, N. C.

THE BULLETIN

OF THE

North Carolina Department of Agriculture.

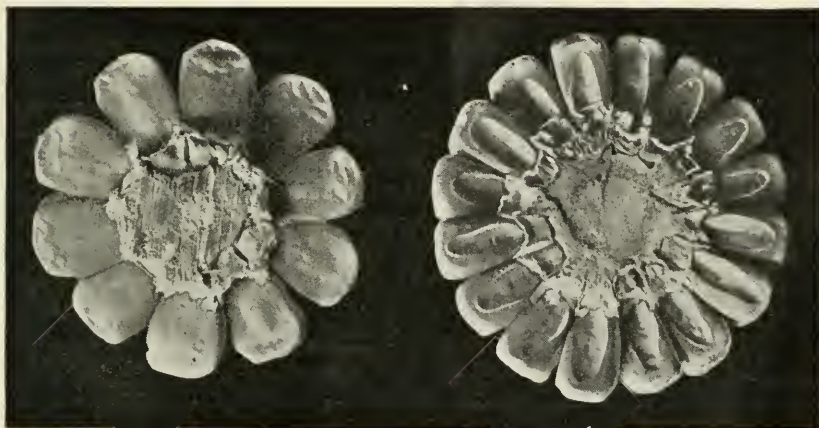
ANNUAL REPORT

OF

FARMERS' INSTITUTES, 1907

BY

TAIT BUTLER.



1

COB TOO SMALL AND TOO MUCH SPACE
BETWEEN ROWS OF KERNELS.

2

A GOOD TYPE.

WHICH KIND ARE YOU PLANTING?

OCTOBER, 1907.

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION.

STATE BOARD OF AGRICULTURE.

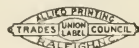
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 R. W. COLLETT, Superintendent Transylvania Test Farm, Blantyre, N. C.



THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 10.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, OCTOBER, 1907.

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REPORT OF FARMERS' INSTITUTE WORK, 1907.

By TAIT BUTLER, Director.

During the past year—October 1, 1906, to September 30, 1907—the State Department of Agriculture has held 169 institutes—119 for men and 50 for women. The 119 institutes for men have been held in 93 counties—all except Carteret, Dare, Hyde, Moore and Wake. The 50 women's institutes have been held in 38 counties. The following will show the growth of the institute work during recent years:

1898— 28 institutes in 27 counties.
 1903— 17 institutes in 16 counties.
 1904— 58 institutes in 58 counties.
 1905— 79 institutes in 76 counties.
 1906—136 institutes in 91 counties.
 1907—169 institutes in 93 counties.

MEN'S INSTITUTES.

The number of institutes held for men this year has only been slightly larger than that held last year, and the same general policy has been pursued in their management. Nothing but strictly agricultural subjects have been discussed, and these chiefly with a view to giving information of a practical and useful nature. The plan of selecting lecturers from among our most successful farmers and our best teachers of scientific agriculture has been continued, and when practicable these have been assisted by prominent agriculturists from other States. The aim has been to have at each institute at least one of each of these two classes of lecturers. That the farmers of the State approve of this sort of institutes is clearly shown by the intense interest and desire for information exhibited and by the fact that at nearly every institute held this year the attendance was considerably larger than at those held at the same place in previous years.

INSTITUTES FOR MEN HELD BETWEEN OCTOBER 1, 1906, AND SEPTEMBER 30, 1907.

Date.	County.	Location.	Speakers Furnished by the State.	Attendance.
July 31	Alamance -----	Graham -----	Stevens, McLendon, Roberts-----	215
Aug. 24	Alexander-----	Taylorville -----	Sherman, Williams, French-----	100
Aug. 24	Alleghany -----	Sparta-----	Sherman, Williams, French-----	52
July 23	Anson -----	Wadesboro -----	Sherman, Conner, Conover-----	170
July 24	Anson -----	Polkton -----	Sherman, Redding, Stevens-----	140
Aug. 15	Ashe -----	Jefferson -----	Sherman, Williams, French-----	64

INSTITUTES FOR MEN HELD BETWEEN OCTOBER 1, 1906, AND SEPTEMBER 30, 1907.

Date.	County.	Location.	Speakers Furnished by the State.	Attendance.
Aug. 16	Beaufort -----	Washington -----	Stevens, Redding, Browne-----	161
Dec. 11	Bertie -----	Windsor -----	Butler, Scott, Browne-----	62
Dec. 10	Bladen -----	Elizabethtown -----	Sherman, Parker, Hutt -----	61
July 20	Bladen -----	Elizabethtown -----	Butler, Redding, Layton -----	115
Dec. 14	Brunswick -----	Bolivia -----	Sherman, Parker, Hutt -----	245
Aug. 6	Brunswick -----	Bolivia -----	Stevens, McLendon, Browne -----	170
Aug. 12	Buncombe-----	Weaverville -----	Hutt, Conner -----	100
Aug. 13	Buncombe-----	Sand Hill -----	Hutt, Conner -----	100
Aug. 1	Burke-----	Morganton -----	Hutt, Conner, Meacham-----	53
July 29	Cabarrus -----	Concord -----	Stevens, Redding, Conover-----	250
Aug. 21	Caldwell-----	Lenoir -----	Sherman, Williams, French-----	76
Dec. 18	Camden -----	Camden -----	Butler, Scott, Moore-----	41
July 23	Caswell-----	Semora -----	Hutt, Parker -----	27
July 24	Caswell-----	Pelham -----	Hutt, Parker -----	100
July 31	Catawba-----	Newton -----	Conner, Conover, Meacham, Moore-----	185
Aug. 22	Catawba-----	Hickory -----	Sherman, Williams, French-----	85
Aug. 10	Chatham -----	Pittsboro -----	Butler, Redding -----	78
Aug. 23	Cherokee -----	Andrews -----	Hutt, Conner -----	80
Dec. 14	Chowan -----	Edenton -----	Butler, Browne, Scott, Moore-----	108
Aug. 24	Clay -----	Hayesville -----	Hutt, Conner -----	60
July 27	Cleveland -----	Shelby -----	Sherman, Conner, Conover-----	425
Dec. 12	Columbus -----	Whiteville -----	Sherman, Parker, Hutt -----	48
Aug. 7	Columbus -----	Whiteville -----	Stevens, McLendon, Browne-----	135
Dec. 18	Craven -----	New Bern -----	Sherman, Hutt, Parker -----	30
Aug. 3	Cumberland -----	Fayetteville -----	Butler, Parker, Stevens-----	83
Dec. 22	Currituck -----	Currituck -----	Butler, Scott, Moore-----	48
Aug. 3	Davidson -----	Lexington -----	Sherman, McLendon, Browne-----	194
Aug. 1	Davie-----	Mocksville-----	Sherman, McLendon, Browne-----	195
Aug. 22	Duplin -----	Warsaw -----	Butler, Parker -----	113
July 20	Durham -----	County Home -----	Parker, Stevens, McLendon-----	160
July 11	Edgecombe-----	Wrendale-----	Parker, McLendon -----	300
July 12	Edgecombe-----	Tarboro -----	Butler, Parker, McLendon -----	55
July 29	Forsyth -----	Winston-Salem-----	Parker, Hutt, Ross-----	188
Aug. 9	Forsyth -----	Rural Hall-----	Sherman, Williams, French-----	90
July 16	Franklin -----	Louisburg -----	Parker, Stevens, McLendon-----	203
July 26	Gaston -----	Dallas -----	Sherman, Conner, Conover-----	220
Aug. 19	Gates-----	Gatesville-----	Butler, Parker, Browne-----	75
Aug. 22	Graham -----	Robbinsville-----	Hutt, Conner -----	80
July 19	Granville -----	Oxford -----	Parker, Stevens, McLendon-----	73

INSTITUTES FOR MEN HELD BETWEEN OCTOBER 1, 1906, AND SEPTEMBER 30, 1907.

Date.	County.	Location.	Speakers Furnished by the State.	Attendance.
Aug. 10	Greene -----	Snow Hill -----	Stevens, McLendon, Browne -----	126
July 30	Guilford -----	Guilford College -----	Stevens, McLendon, Butler, Ross ----	135
Aug. 6	Guilford -----	Alamance Church ----	Butler, Sherman, Redding -----	170
Aug. 17	Halifax -----	Enfield -----	Stevens, Redding, Browne -----	126
Aug. 2	Harnett -----	Lillington -----	Butler, Parker, Stevens -----	235
Aug. 17	Haywood -----	Waynesville -----	Hutt, Conner -----	50
Aug. 14	Henderson -----	Hendersonville -----	Hutt, Conner -----	60
Aug. 20	Hertford -----	Winton -----	Butler, Parker, Browne -----	83
July 27	Iredell -----	Mooreville -----	Butler, Redding, Stevens -----	164
Aug. 23	Iredell -----	State Test Farm ----	Sherman, Williams, French -----	500
Aug. 20	Jackson -----	Sylva -----	Hutt, Conner -----	250
Aug. 24	Johnston -----	Smithfield -----	Butler, Parker -----	115
Dec. 21	Jones -----	Trenton -----	Sherman, Hutt, Parker -----	23
Aug. 12	Lee -----	Jonesboro -----	Butler, Redding -----	325
Dec. 8	Lenoir -----	Kinston -----	Sherman, Conner, Parker -----	47
Aug. 14	Lenoir -----	Kinston -----	Stevens, Redding, Browne -----	83
July 26	Lincoln -----	Lincolnton -----	Sherman, Conner, Conover -----	195
Aug. 2	McDowell -----	Marion -----	Hutt, Conner -----	32
Aug. 19	Macon -----	Franklin -----	Hutt, Conner -----	110
Aug. 9	Madison -----	Mars Hill -----	Hutt, Conner -----	53
Aug. 10	Madison -----	Marshall -----	Hutt, Conner -----	55
Dec. 12	Martin -----	Williamston -----	Butler, Scott, Moore -----	34
July 26	Mecklenburg ---	Huntersville -----	Butler, Redding, Stevens -----	450
July 29	Mecklenburg ---	Piedmont Industrial School -----	Butler, Sherman, Conner -----	150
July 30	Mecklenburg ---	Hickory Grove -----	Sherman, Redding, Conover -----	275
July 31	Mecklenburg ---	Sardis -----	Sherman, Redding, Fisher -----	150
Aug. 6	Mitchell -----	Bakersville -----	Hutt, Conner -----	72
Aug. 8	Montgomery ---	Troy -----	Butler, Redding -----	231
July 13	Nash -----	Nashville -----	Butler, Parker, McLendon -----	73
Aug. 8	New Hanover ---	Wilmington -----	Stevens, McLendon, Browne -----	20
Aug. 21	Northampton ---	Rich Square -----	Butler, Parker, Browne -----	166
Dec. 17	Onslow -----	Jacksonville -----	Sherman, Parker, Hutt -----	90
Aug. 1	Orange -----	Hillsboro -----	Butler, Stevens -----	325
Dec. 19	Pamlico -----	Bayboro -----	Sherman, Hutt, Parker -----	36
Dec. 17	Pasquotank ---	Elizabeth City -----	Butler, Scott, Moore -----	143
Aug. 9	Pender -----	Burgaw -----	Stevens, McLendon, Browne -----	140
Dec. 15	Perquimans ---	Hertford -----	Butler, Scott, Browne, Moore -----	46
July 22	Person -----	Roxboro -----	Parker, Hutt -----	137
Aug. 15	Pitt -----	Greenville -----	Stevens, Redding, Browne -----	193

INSTITUTES FOR MEN HELD BETWEEN OCTOBER 1, 1906, AND SEPTEMBER 30, 1907.

Date.	County.	Location.	Speakers Furnished by the State.	Attendance.
Aug. 16	Polk -----	Columbus -----	Hutt, Conner-----	85
Aug. 7	Randolph-----	Ashboro -----	Butler, Sherman, Redding -----	170
July 23	Richmond -----	Rockingham-----	Butler, Stevens, Redding -----	110
July 18	Robeson -----	Raft Swamp-----	Butler, Redding, Layton -----	175
July 19	Robeson -----	Barnesville-----	Butler, Redding, Layton -----	120
July 25	Rockingham-----	Leaksville -----	Parker, Hutt, Ross-----	40
July 26	Rockingham-----	Sylvania School -----	Parker, Hutt, Ross-----	200
July 30	Rowan-----	Salisbury -----	Conner, Butler, Meacham -----	122
Aug. 2	Rowan-----	China Grove-----	Sherman, McLendon, Browne-----	247
Aug. 3	Rutherford-----	Rutherfordton-----	Hutt, Conner, Meacham-----	152
Aug. 23	Sampson -----	Clinton -----	Butler, Parker-----	204
July 22	Scotland-----	Sneeds Grove-----	Stevens, Redding, Layton-----	250
Aug. 5	Stanly -----	Albemarle-----	Butler, Sherman -----	335
July 27	Stokes-----	I. G. Ross' Farm-----	Parker, Hutt-----	250
Aug. 12	Surry -----	Dobson -----	Sherman, Williams, French -----	195
Aug. 21	Swain -----	Bryson City -----	Hutt, Conner-----	75
Aug. 15	Transylvania-----	Brevard -----	Hutt, Conner-----	35
Dec. 20	Tyrrell -----	Columbia -----	Butler, Scott, Moore-----	42
July 24	Union -----	Marshville-----	Butler, Conner, Conover-----	240
July 25	Union -----	Carmel -----	Butler, Redding, McLendon, Stevens-----	125
July 18	Vance -----	Henderson -----	Parker, Stevens, McLendon-----	75
July 17	Warren-----	Warrenton -----	Parker, Stevens, McLendon-----	200
Dec. 13	Washington-----	Roper -----	Butler, Scott, Moore-----	32
Aug. 19	Watauga -----	Boone -----	Sherman, Williams, French -----	158
Aug. 12	Wayne -----	Powell's Springs-----	Stevens, McLendon, Browne -----	250
Aug. 13	Wayne -----	Woodland -----	Stevens, McLendon -----	102
Aug. 10	Wilkes -----	Wilkesboro -----	Sherman, Williams, French -----	83
July 10	Wilson -----	Elm City -----	Butler, Parker, McLendon -----	65
July 13	Yadkin -----	Yadkinville-----	Sherman, Williams, French -----	184
Aug. 7	Yancey -----	Burnsville-----	Hutt, Conner-----	85

SPECIAL INSTITUTES—FRUIT GROWERS.

Date.	County.	Location.	Speakers Furnished by the State.	Attendance.
Mar. 14	Alexander-----	Kilbys Gap -----	Sherman, Hutt, Smith -----	100
May 9	Alexander-----	Kilbys Gap -----	Smith, Meacham -----	125
Aug. 8	Alexander-----	Kilbys Gap -----	Smith -----	100
April 18	Surry-----	Mount Airy -----	Sherman, Hutt -----	60
Aug. 30	Surry-----	Mount Airy -----	Reimer -----	50

MEN'S INSTITUTE SPEAKERS AND SUBJECTS.

LECTURER.	Number Institutes Attended.	SUBJECTS.
TAIT BUTLER----- Director Farmers Institutes and State Veterinarian.	38	How to Harvest the Corn. Crop Rotation. How to Eradicate the Cattle Tick. Common Disease of Live Stock. Commercial Fertilizers. Selecting a Dairy Cow.
FRANKLIN SHERMAN, JR.----- State Entomologist.	34	Insect Pests and Spraying. Suggestions for the Improvement of Farm Homes.
W. N. HUTT----- State Horticulturist.	33	Orchard Management. The Farm Fruit Garden. Soil Improvement. Commercial Apple Growing.
T. B. PARKER----- Farmer.	31	Legumes and Their Value in Soil Improve- ment. Corn Culture. Commercial Fertilizers and Their Use. Farm Machinery and Implements.
C. M. CONNER----- Professor of Agriculture.	28	Commercial Fertilizers and Their Use. How and Why we Cultivate. Problems in the Growing of Live Stock. Wheat Culture. Corn Culture.
F. L. STEVENS----- Biologist.	26	Plant Diseases and Spraying. The Value of an Agricultural Education-- Illustrated.
W. J. MCLENDON----- Farmer.	22	Cotton Culture. Soil Improvement.
R. J. REDDING----- Formerly Director Georgia Experiment Station.	21	Cotton Culture. Corn Culture. Oat Culture. Commercial Fertilizers and Their Use.
T. E. BROWNE----- Farmer.	18	Peanut Culture. Commercial Fertilizers.
C. B. WILLIAMS----- Director North Carolina Experiment Station.	11	The Improvement of Corn by Seed Selec- tion. Commercial Fertilizers.
A. L. FRENCH----- Stock Breeder.	11	The Silo. Problems in Cattle Raising.
R. W. SCOTT----- Farmer.	9	Corn Culture. Diversified Farming Profitable.
C. C. MOORE----- Dairyman and President North Carolina Cotton Growers Association.	9	The Production of Forage Crops.
J. A. CONOVER----- Dairyman in charge of Co-operative Dairy Demonstration Work in North Carolina for United States Department of Agriculture.	8	Farm Dairying. How the Federal Department of Agricul- ture is Endeavoring to Aid the Dairymen of North Carolina.
F. T. MEACHAM----- Superintendent Iredell Test Farm, State Department of Agriculture.	6	Wheat Culture. Corn Culture. Oat Culture.
I. G. ROSS----- Farmer.	4	Corn Culture.
N. A. LAYTON----- Farmer.	4	The Farmer's Fruit Garden.

MEN'S INSTITUTE SPEAKERS AND SUBJECTS.

LECTURER.	Number Institutes Attended.	SUBJECTS.
L. M. SMITH ----- Entomologist.	3	Insect Pests and Spraying. Grading Apples.
ADAM FISHER ----- Veterinarian.	1	Common Diseases of Farm Live Stock.
G. A. ROBERTS ----- Veterinarian.	1	Common Diseases of Farm Live Stock. The Improvement of Farm Live Stock.
F. C. REIMER ----- Horticulturist.	1	Cultivating and Fertilizing the Apple Orchard.

COUNTY AND LOCAL ORGANIZATIONS.

There now exists a Farmers' Institute organization, or committee, in each of 95 counties of the State—in all except the counties of Carteret, Dare and Wake—and in several counties such as Catawba, Forsyth, Iredell, Mecklenburg and Rowan, where more than one institute has been held annually for several years, there have also been organized local institute committees. The number of committees now organized is 105 for men and 54 for women.

Up to this time no effort has been made to extend the scope and duties of the county organization beyond the selecting of a committee, constituted of one active farmer from each township, and requiring of it the advertising and arranging for the annual institute.

That each township and eventually each neighborhood should maintain a Farmers' Institute organization for the purpose of creating interest in and disseminating agricultural information is beyond question, but in many sections there has not yet been developed sufficient interest in this work to actuate the existing simple county organizations to properly arrange for and advertise one county institute each year. In such cases it would be useless to attempt a more complex organization for the extension of the work, but in several counties or sections there now appears to be sufficient interest to justify an attempt to extend the organization to the formation of township or neighborhood clubs, or institutes, with more frequent meetings of both the local and county organizations. In several counties of the State local clubs or institutes holding meetings monthly, bi-monthly or quarterly, and the county organization holding institutes quarterly or semi-annually, seems not too much to expect in the near future, and during the coming year an attempt will be made to effect such an extension of the work in several of the more progressive counties.

COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Alamance -----	W. H. Turrentine -----	Burlington.
Alexander -----	J. N. Smith -----	Taylorsville.
Alleghany -----	S. F. Thompson -----	Walls.
Anson -----	Dr. W. J. McLendon -----	Wadesboro.
Ashe -----	John Dent -----	Jefferson.
Beaufort -----	W. D. Grimes -----	Washington.
Bertie -----	C. W. Spruill -----	Quitsna.
Bladen -----	R. B. Cromartie -----	Elizabethtown.
Brunswick -----	J. Johnson -----	Winnabow.
Buncombe -----	C. P. Weaver -----	Alexander.
Burke -----	J. E. Coulter -----	Connelly Springs.
Cabarrus -----	J. P. Allison -----	Concord.
Caldwell -----	George Goforth -----	Lenoir.
Camden -----	W. G. Ferebee -----	Gregory.
Caswell -----	B. S. Graves -----	Yanceyville.
Catawba -----	John Robinson (local) -----	Hickory.
Catawba -----	C. E. Smyre (county) -----	Newton.
Chatham -----	W. B. Wilson -----	Patmos.
Cherokee -----	W. P. Walker -----	Andrews.
Chowan -----	M. Makely -----	Edenton.
Cleveland -----	J. T. Gardner -----	Shelby.
Columbus -----	Ira Lennon -----	Whiteville.
Craven -----	J. M. Spencer -----	New Bern.
Cumberland -----	W. H. Downing -----	Fayetteville.
Currituck -----	George W. Williams -----	Currituck.
Davidson -----	P. J. Leonard -----	Lexington.
Davie -----	S. A. Woodruff -----	Mocksville.
Duplin -----	J. A. Shine -----	Faison.
Durham -----	P. H. Massey -----	Durham.
Edgecombe -----	G. A. Holderness (county) -----	Tarboro.
Edgecombe -----	J. O. W. Gravely (local) -----	Rocky Mount.
Forsyth -----	A. B. Atwood (county) -----	Winston-Salem.
Forsyth -----	Luther Strupe (Rural Hall) -----	Tobaccoville.
Franklin -----	T. B. Wilder -----	Louisburg.
Gaston -----	C. F. Smith -----	Stanley.
Gates -----	Lycurgus Hofler -----	Gatesville.
Graham -----	G. B. Walker -----	Robbinsville.
Granville -----	W. T. Allen -----	Oxford.
Greene -----	W. A. Darden -----	Ayden.

COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Guilford-----	J. Franklin Davis-----	Guilford College.
Halifax-----	J. R. Sherron-----	Enfield.
Harnett-----	C. McArtan-----	Lillington.
Haywood-----	Dr. G. D. Green-----	Waynesville.
Henderson-----	P. F. Patton-----	Hendersonville,
Hertford-----	W. P. Shaw-----	Winton.
Hyde-----	Charles Brim-----	Swan Quarter.
Iredell-----	H. S. King (county)-----	Statesville.
Iredell-----	W. L. Matheson (local)-----	Mooresville.
Jackson-----	G. P. Miller-----	Sylva.
Johnston-----	W. M. Sanders-----	Smithfield.
Jones-----	J. C. Parker-----	Oliver.
Lee-----	W. I. Brooks-----	Jonesboro.
Lenoir-----	G. F. Loftin-----	Kinston.
Lincoln-----	H. D. Warlick-----	Reepsville.
McDowell-----	Dr. R. J. Burgin-----	Marion.
Macon-----	Arthur Siler-----	Franklin.
Madison-----	J. R. Sams (local)-----	Mars Hill.
Madison-----	J. F. Bryan (county)-----	Marshall.
Martin-----	W. A. Everett-----	Robersonville.
Mecklenburg-----	C. C. Moore (county)-----	Charlotte.
Mecklenburg-----	J. W. Potts (local)-----	Pineville.
Mecklenburg-----	N. S. Alexander (local, Hickory Grove)-----	Charlotte.
Mecklenburg-----	William Caldwell (local)-----	Huntersville.
Mitchell-----	S. M. C. Green-----	Tocane.
Montgomery-----	C. C. Wade-----	Troy.
Moore-----	H. C. Dowd-----	Carthage.
Nash-----	W. E. Jeffrey-----	Rocky Mount.
New Hanover-----	George W. Trask-----	Wilmington.
Northampton-----	T. C. Peel-----	Rich Square.
Onslow-----	James Grant-----	Sneads Ferry.
Orange-----	S. W. Andrews-----	Hillsboro.
Pamlico-----	W. H. Sawyer-----	Bayboro.
Pasquotank-----	R. Nixon Morgan-----	Elizabeth City.
Pender-----	W. M. Hand-----	Burgaw.
Perquimans-----	David Cox-----	Hertford.
Person-----	J. A. Long-----	Roxboro.
Pitt-----	O. L. Joyner-----	Greenville.
Polk-----	T. T. Ballinger-----	Tryon.

COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Randolph-----	John F. Beeson-----	Randleman.
Richmond-----	W. I. Everett-----	Rockingham.
Robeson-----	E. F. McRae-----	Maxton.
Rockingham-----	J. V. Price (county)-----	Wentworth.
Rockingham-----	J. Robert Garrett (local)-----	Thompsonville.
Rowan-----	B. B. Miller (county)-----	Salisbury.
Rowan-----	B. S. Brown (local)-----	China Grove.
Rutherford-----	W. K. McDowell-----	Island Ford.
Sampson-----	S. H. Hobbs-----	Clinton.
Scotland-----	William F. Gibson-----	Gibson.
Stanly-----	George T. Dunlap-----	Norwood.
Stokes-----	I. G. Ross-----	Walnut Cove.
Surry-----	S. C. Franklin-----	Mount Airy.
Swain-----	W. H. Queen-----	Oconalufy.
Transylvania-----	G. W. Wilson-----	Davidson's River.
Tyrrell-----	E. B. Hopkins-----	Columbia.
Union-----	T. J. W. Broom-----	Monroe.
Vance-----	T. P. Stewart-----	Henderson.
Wake-----	G. M. Beavers (local)-----	Apex.
Warren-----	H. T. Macon-----	Warrenton.
Washington-----	T. W. Blount-----	Roper.
Watauga-----	T. C. Baird-----	Valle Crucis.
Wayne-----	H. D. Ham-----	Goldsboro.
Wilkes-----	J. G. Hackett-----	North Wilkesboro.
Wilson-----	Walter F. Woodard-----	Wilson.
Yadkin-----	John F. Long-----	Chestnut Ridge.
Yancey-----	W. B. Wray-----	Cane River.

SPECIAL INSTITUTES.

Alexander-----	John Gwaltney, President-----	Taylorsville.
	W. T. Rowland, Secretary-----	Taylorsville.
Surry-----	B. F. Sparger, President-----	Mt. Airy.

FARMERS' STATE CONVENTION.

H. C. Dockery-----	Rockingham, N. C.-----	President.
Tait Butler-----	Raleigh, N. C.-----	Secretary.

WOMEN'S INSTITUTES.

The holding of institutes for the women in the farm homes was inaugurated in 1906 and 21 institutes were held in 19 counties. During 1907 this work was greatly extended, there being held 50 institutes in 38 counties.

The success of these Women's Institutes has more than justified our assumption that an effort to improve rural conditions through the co-operation of the women on the farms would be as effective as the institutes for men had been. Allowing for the general lack of knowledge regarding the purposes or objects of these institutes, the interest in them and the appreciation shown for the information sought to be imparted have been very gratifying, and indicate very plainly that the women on the farms of the State are ready to take hold of the work and make it a tremendous power for the upbuilding of farm conditions and farm life. The best farms are impossible without the best farm homes, and a knowledge of modern domestic science is as important and useful to the woman who is to develop and maintain the ideal farm home of the future as is a knowledge of modern agricultural science to the man who is to build up a model farm.

For the benefit of those not entirely familiar with the scope and nature of the work contemplated by these Women's Institutes, the following list of subjects is given as a sample of the topics discussed:

- The Farm Fruit Garden.
- The Farm Vegetable Garden.
- Farm Poultry.
- Farm Butter Making.
- Beautifying the Home Surroundings.
- Home Conveniences.
- Literature for the Farm Home.
- Home-making.
- Home Nursing.
- The Nutritive Value of Foods.
- Cooking Meats, Vegetables, etc.
- Bread Making.
- Educating the Girls on the Farm.

The usual practice has been to hold the Women's Institute on the same day and at the same place as the institute for men, but in a separate hall. At least one and usually two separate sessions are held, which enable the women to form an organization of their own and permits of greater freedom in the discussion of special household topics, many of which would neither be instructive nor interesting to a mixed or general audience.

Two women lecturers are usually sent out by the State to each meeting, and when a joint afternoon session is not held with the men, some of the lecturers from the men's institute usually assist at the women's meeting in the discussion of such subjects as dairying, poultry-raising and gardening.

The objects of these women's meetings, as with those for men, has been one of instruction rather than entertainment.

INSTITUTES FOR WOMEN HELD BETWEEN OCTOBER 1, 1906, AND SEPTEMBER 30, 1907.

Date.	County.	Location.	Speakers Furnished by the State.	Attendance.
July 31	Alamance -----	Graham -----	Mrs. Stevens, Mrs. Grimes-----	22
Aug. 24	Alexander-----	Taylorsville -----	Miss Card, Mrs. Grimes -----	30
July 23	Anson -----	Wadesboro -----	Miss Card, Mrs. Hollowell-----	35
July 24	Anson -----	Polkton-----	Mrs. Stevens, Mrs. Grimes -----	45
Dec. 11	Bladen -----	Elizabethtown -----	Miss Card, Mrs. Hollowell-----	24
July 20	Bladen -----	Elizabethtown -----	Mrs. Stevens, Mrs. Grimes -----	40
July 29	Cabarrus-----	Concord -----	Miss Card, Mrs. Hollowell-----	35
Dec. 18	Camden -----	Camden -----	Miss Card, Mrs. Stevens, Mrs. Hollowell.	8
July 31	Catawba-----	Newton -----	Miss Card, Mrs. Hollowell -----	40
Aug. 22	Catawba-----	Hickory -----	Miss Card, Mrs. Grimes -----	30
Aug. 10	Chatham -----	Pittsboro -----	Mrs. Hollowell, Mrs. Grimes -----	4
Dec.	Chowan -----	Edenton-----	Miss Card, Mrs. Stevens, Mrs. Hollowell.	35
July 27	Cleveland-----	Shelby-----	Mrs. Stevens, Mrs. Grimes -----	30
Dec.	Columbus -----	Whiteville-----	Miss Card, Mrs. Hollowell-----	12
Aug. 7	Columbus -----	Whiteville-----	Miss Card, Mrs. Stevens-----	30
Aug. 3	Cumberland-----	Fayetteville -----	Mrs. Stevens, Mrs. Grimes -----	22
Dec. 22	Currituck -----	Currituck -----	Miss Card, Mrs. Stevens-----	4
Aug. 3	Davidson -----	Lexington-----	Miss Card, Mrs. Hollowell-----	25
Aug. 1	Davie-----	Mocksville-----	Miss Card, Mrs. Hollowell-----	23
July 20	Durham -----	County Home -----	Miss Card, Mrs. Hollowell-----	100
July 16	Franklin -----	Louisburg -----	Miss Card, Mrs. Hollowell-----	24
July 25	Gaston -----	Dallas -----	Mrs. Stevens, Mrs. Grimes -----	65
July 19	Granville -----	Oxford -----	Miss Card, Mrs. Hollowell-----	12
Aug. 2	Harnett -----	Lillington -----	Mrs. Stevens, Mrs. Grimes -----	70
July 27	Iredell-----	Mooreville -----	Miss Card, Mrs. Hollowell-----	20
Aug. 23	Iredell-----	State Test Farm. -----	Miss Card, Mrs. Grimes -----	150
Aug. 24	Johnston -----	Smithfield -----	Mrs. Stevens, Mrs. Hollowell-----	25
Dec. 8	Lenoir -----	Kinston -----	Miss Card, Mrs. Stevens, Mrs. Hollowell.	9
Aug. 14	Lenoir -----	Kinston -----	Miss Card, Mrs. Hollowell-----	11
July 26	Lincoln-----	Lincolnton -----	Mrs. Stevens, Mrs. Grimes -----	75
July 26	Mecklenburg-----	Huntersville-----	Miss Card, Mrs. Hollowell-----	100

INSTITUTES FOR WOMEN HELD BETWEEN OCTOBER 1, 1906, AND SEPTEMBER 30, 1907.

Date.	County.	Location.	Speakers Furnished by the State.	Attendance.
July 29	Mecklenburg ---	Piedmont Industrial School.	Mrs. Stevens, Mrs. Grimes -----	100
July 30	Mecklenburg ---	Hickory Grove -----	Mrs. Stevens, Mrs. Grimes -----	250
Aug. 1	Orange -----	Hillsboro -----	Mrs. Stevens, Mrs. Grimes -----	40
Dec. 17.	Pasquotank ---	Elizabeth City -----	Miss Card, Mrs. Hollowell, Mrs. Stevens.	75
Aug. 9	Pender -----	Burgaw -----	Miss Card, Mrs. Stevens -----	50
Dec. 15	Perquimans ---	Hertford -----	Miss Card, Mrs. Hollowell, Mrs. Stevens.	3
July 23	Richmond -----	Rockingham -----	Mrs. Stevens, Mrs. Grimes -----	25
July 18	Robeson -----	Raft Swamp -----	Mrs. Stevens, Mrs. Grimes -----	250
July 19	Robeson -----	Barnesville -----	Mrs. Stevens, Mrs. Grimes -----	45
July 30	Rowan -----	Salisbury -----	Miss Card, Mrs. Hollowell -----	25
Aug. 2	Rowan -----	China Grove -----	Miss Card, Mrs. Hollowell -----	120
July 22	Scotland -----	Sneeds Grove -----	Mrs. Stevens, Mrs. Grimes -----	200
Dec. 20	Tyrrell -----	Columbia -----	Miss Card, Mrs. Stevens -----	8
July 24	Union -----	Marshville -----	Miss Card, Mrs. Hollowell -----	45
July 25	Union -----	Carmel -----	Miss Card, Mrs. Hollowell -----	60
July 18	Vance -----	Henderson -----	Miss Card, Mrs. Hollowell -----	11
July 17	Warren -----	Warrenton -----	Miss Card, Mrs. Hollowell -----	60
Aug. 12	Wayne -----	Powell's Springs -----	Miss Card, Mrs. Hollowell -----	175
Aug. 13	Wayne -----	Woodland -----	Miss Card, Mrs. Hollowell -----	50

WOMEN'S INSTITUTE SPEAKERS AND SUBJECTS.

LECTURERS.	Number Institutes Attended.	SUBJECTS.
MISS H. MAE CARD ----- Assistant Pure Food Division and Women's Institutes, North Carolina Department of Agriculture.	33	Foods and Their Cooking. Home Making. Suggestions for Home Nursing.
MRS. SUE V. HOLLOWELL -----	28	Woman's Influence in the Home. Suggestions to the Men and Women on the Farms for the Improvement of Farm Homes.
MRS. F. L. STEVENS -----	25	Home Nursing and the Prevention of Disease. The Relation of the Home and School. Beautifying Home Surroundings.
MRS. WALTER GRIMES -----	19	Home Economies and Conveniences. Beautifying the Farm Home.

COUNTY AND LOCAL ORGANIZATIONS.

The same general plan of organization has been followed with the Women's Institutes as with those for men. A county institute committee was selected in each county where an institute was held, and where there was more than one institute in a county a local committee was also organized. When these county committees become sufficiently interested and active then township or neighborhood clubs or institutes, with more frequent meetings, are hoped for.

COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Alamance -----	Miss Eula Dixon-----	Snow Camp.
Alexander-----	Mrs. W. T. Rowland-----	Taylorsville.
Anson -----	Mrs. J. G. Boylin (county) -----	Wadesboro.
Anson -----	Mrs. S. K. Harriss (local) -----	Polkton.
Bladen -----	Mrs. Eliza B. Cromartie-----	Clarkton, R. F. D.
Cabarrus -----	Mrs. J. F. Barnhart-----	Concord, R. F. D. 4.
Camden -----	Mrs. E. I. Sawyer -----	Camden.
Catawba-----	Miss Ann Yoder (Newton) -----	Hickory, R. F. D. 1.
Catawba-----	Mrs. W. H. Nicholson (Hickory) -----	Hickory.
Chatham -----	Mrs. Rom. Eubanks -----	Pittsboro.
Chowan -----	Mrs. D. G. Bond-----	Edenton.
Cleveland-----	Mrs. Lucy A. Walker -----	Lattimore.
Columbus -----	Mrs. E. H. Miller-----	Chadbourn.
Cumberland-----	Mrs. J. H. Currie-----	Fayetteville, R. F. D. 2.
Currituck -----	Mrs. C. B. Humphrey -----	Tulls.
Davidson -----	Mrs. C. V. Wilson -----	Lexington, R. F. D. 1.
Davie-----	Mrs. Sarah Hanes -----	Mocksville.
Durham -----	Mrs. P. H. Massey -----	Durham, R. F. D. 3.
Franklin -----	Mrs. J. E. Malone -----	Louisburg.
Gaston -----	Miss Mabel Bulwinkle-----	Dallas.
Granville -----	Mrs. B. F. Hester -----	Oxford, R. F. D. 1.
Harnett -----	Mrs. S. H. Washburn -----	Lillington.
Iredell -----		
Iredell -----	Mrs. W. B. Harris -----	Mooreville.
Johnston -----	Mrs. D. J. Wellons -----	Smithfield, R. F. D. 1.
Lenoir-----	Miss B. L. Elmore -----	Kinston, R. F. D. 4.
Lincoln-----	Mrs. T. H. Cansler -----	Lincolnton, R. F. D. 2.
Martin -----	Mrs. J. B. Hardison -----	Williamston, R. F. D. 4.
Mecklenburg -----	Mrs. B. T. Price (county) -----	Charlotte, R. F. D.
Mecklenburg -----	Mrs. Z. W. S. Tayloe (Hickory Grove) -----	Charlotte, R. F. D. 9.

COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Mecklenburg -----	Mrs. G. F. Overcash (Huntersville)-----	Huntersville.
Mecklenburg -----	Mrs. L. W. Hovis (Piedmont Industrial School)---	Charlotte.
Mecklenburg -----	Mrs. Ferry Pegram (Shopton) -----	Charlotte, R. F. D. 12.
Mecklenburg -----	Mrs. Dr. Abernethy (Alexander Academy) -----	Charlotte, R. F. D. 2.
Orange -----	Mrs. H. D. Woods -----	Cedar Grove.
Pasquotank -----	Mrs. J. N. Winslow -----	Elizabeth City.
Pender -----	Mrs. E. McN. Moore-----	Burgaw.
Perquimans -----	Mrs. B. Perry -----	Belvidere.
Richmond -----	Mrs. E. D. Whitlock-----	Rockingham.
Robeson -----	Mrs. R. N. Williams (Maxton) -----	Maxton.
Robeson -----	Mrs. W. K. Culbreth (Lumberton)-----	Lumberton, R. F. D. 6.
Robeson -----	Mrs. K. M. Barnes (local) -----	Barnesville.
Rockingham -----	Mrs. J. D. Meador -----	Stoneville, R. F. D. 1.
Rowan -----	Mrs. M. E. Heller (county) -----	Faith.
Rowan -----	Mrs. L. E. Fisher (China Grove) -----	Salisbury, R. F. D. 2.
Scotland -----	Mrs. J. M. Wright-----	Laurinburg, R. F. D. 2.
Stokes -----	Miss D. B. Petree -----	King, R. F. D. 1.
Tyrrell -----	Mrs. C. W. Swain -----	Jerry.
Union -----	Mrs. L. L. Green (Marshville)-----	Marshville, R. F. D. 3.
Union -----	Miss Jessie Edwards (Carmel) -----	Monroe, R. F. D. 4.
Vance -----	Mrs. J. A. Gill -----	Henderson, R. F. D. 4.
Warren -----	Mrs. J. F. Hunter -----	Arcola.
Washington -----	Mrs. T. W. Blount -----	Roper.
Wayne -----	Mrs. M. T. Johnson -----	Fremont.
Wayne -----	Miss Lillie Cox -----	Dudley, R. F. D. 2.

WOMEN'S BRANCH OF FARMERS' STATE CONVENTION.

State-at-Large -----	Mrs. W. N. Hutt -----	Raleigh.
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JOINT MEETINGS OF MEN AND WOMEN'S INSTITUTES.

The wisdom of holding separate meetings for the men and women has been questioned, but the experience of the last two years leaves no doubt in the mind of the writer that, while joint sessions are desirable, a separate organization and separate meetings are necessary to the best results. The plan largely adopted, therefore, and the one which seems to give most satisfactory results, is to hold separate meetings during the forenoon and for a portion of the afternoon, and then bring the two audiences together for a joint session of an hour or

more, at which subjects of a dual and general interest are discussed.

It is apparent that many subjects which belong properly to the Farmers' Institute field are of equal interest to the two sexes, and that instruction in dairying, fruit and vegetable gardening, and the general improvement of the farm home, are of equal value to all. Therefore, it has been the usual practice to have such subjects discussed in the joint meetings, the time being divided about equally between men and women lecturers.

NIGHT SESSIONS.

For the first time in the institute work in this State a night session was held at about twenty institutes. On the whole the experiment proved a success, and in the future this feature will be added to all institutes when practicable.

This night session consisted of a lecture by Dr. F. L. Stevens, of the A. and M. College, on the Value of an Agricultural Education, and was illustrated with about 100 lantern slides, showing recent advances in agricultural practice and the value of science to agriculture. The object of this night session is to offer entertainment that will carry with it information of value and furnish inspiration and a desire for greater agricultural knowledge.

THE STATE AUDUBON SOCIETY.

The institute management and the farmers of the State are indebted to the State Audubon Society for a valuable addition to a number of institutes held during the past summer. Through the courtesy and liberality of the Society and its Secretary, Prof. T. Gilbert Pearson, Miss Mary Taylor Moore attended some twenty-five institutes and delivered an interesting and instructive lecture on the Relation of Birds to Agriculture, which was always a feature of the joint sessions where delivered.

SPECIAL INSTITUTES.

During the past year a special apple growers' institute was held in the Brushy Mountain section of Wilkes and Alexander Counties. Several representatives of the Department of Agriculture attended this institute, and a local apple growers' association was organized, and two quarterly meetings have since been held, to which the Department sent speakers.

A similar institute was held at Mt. Airy, in Surry County, and one quarterly meeting has since been held by the local organization formed. At both of these meetings the Department has also had representatives.

It is the desire of the Department to encourage the organization of such local clubs or institutes for the study of special crops or

interests, and when a special industry or crop has developed in any section of the State to an extent sufficient to warrant the holding of a special institute for its study, the Department will lend its aid by sending lecturers to as many meetings as its facilities will permit.

SUGGESTIONS REGARDING FUTURE INSTITUTE WORK.

Farmers' Institutes having now been held in practically every county in the State for two years, it is time the farmers, and especially the local committees, in several counties began to take more interest in the annual institute, or these institutes ought to be discontinued after another trial. Unless the farmers of any county or section take an active, personal interest in the institute it can do but little good, and if something worth while cannot be accomplished the institutes should be discontinued as a matter of policy and right. During the past year much more general interest has been manifested than ever before, but in too many places the farmers still seem to look upon the institutes as belonging not to them but to the Department of Agriculture. They take no personal or proprietary interest in it. This spirit will certainly not result in building up the best institute. County and township farmers' institute organizations or clubs should be formed, arranged and kept up in every county solely by the farmers themselves of the respective localities, and the resources of the State Department of Agriculture should be used for aiding in advertising the annual institutes and supplying part of the lecturers.

The day and date for holding the institute must necessarily be fixed early. Three months before the time contemplated for holding the institute the State Director will send out a schedule of dates for the series of institutes to be held in a certain section of the State. If the local committees will decide promptly whether the date is satisfactory and at once notify the State Director a complete schedule can be arranged early. The local committee should not, except for very good reasons, insist on any exact day or date for its institute.

All institutes cannot be held at the exact time to suit every locality or individual. The most suitable time for holding institutes is from July 20th to September 1st, but all the work cannot be done by the small State force in that time, and the next most satisfactory time, December and January, must be utilized to a limited extent. And even after this extension of the time it is necessary that several institute parties of lecturers be out at one time and that the institutes be held in circuits so as to save time and money in traveling.

If the local committee replies promptly slight changes are always possible, but after the schedule is once fixed it cannot be changed, and therefore the local committee should be vigilant and exert every effort to prevent the selection of the institute date for other meetings. The local committee can do this, but the State Director cannot.

Many North Carolina newspaper editors render great aid to the institute work by their liberality in giving space to its advertisement. Others would do as well if the local committees did their duty. As soon as the date is determined upon, give it to the local paper. Write out a little "news item" stating when the institute will be held and asking farmers to keep that date open for attending this meeting. Every week from the time the date is announced until the institute is held something relating to it should appear in the local paper. The editor is usually a busy man, but if the chairman of the local committee will write out something and hand it in, ready for publication, in nearly every case it will appear in next week's paper.

The local committee in suggesting or making out a program should remember that it ought not to be too long. One or two subjects well covered will result in more good than an attempt to cover the whole field of agriculture. The Department will hereafter probably not send more than two speakers to each institute. They will be specialists and able to cover thoroughly their particular work, but they cannot, in one day, cover the entire agricultural field.

Since only one day in the year is to be devoted to the study of our business in this way, all should be able to give the whole day to it. Let every one who wishes to attend devote the whole day to the institute and get to the place of meeting before 10 A. M. and remain until 4 P. M. With one hour out for dinner this only means five hours devoted to the institute. Surely we can do that much once a year. What a saving of time it would be if all would learn that 10 o'clock does not mean 11 o'clock or 11:30.

Where women's institutes have not yet been held the local Farmers' Institute Committee can and should arrange for one. These institutes for the farmers' wives and daughters will aid the regular farmers' institutes and be of great benefit to the women in the farm homes if they get all out of them that is possible.

STATE FARMERS' CONVENTION.**(ROUND-UP INSTITUTE)****HELD AT THE A. AND M. COLLEGE, WEST RALEIGH, AUGUST 28, 29, 30, 1907.**

The State Farmers' Convention was organized four years ago through the efforts of the Faculty of the Agricultural College and a few others interested in agricultural progress. At the annual meeting of the Convention, July 1906, it was affiliated with or made a part of the Farmers' Institute work conducted by the State Department of Agriculture, and the State Director of Farmers' Institutes made the Secretary of the Convention.

This Convention was intended to be and virtually is a three-day Farmers' Institute. Its aims and purposes are educational, and in preparing the following program of instruction more than mere amusement was the object in view.

While the money available would not permit of the securing of high-priced speakers and teachers from abroad, and the program offered was not equal to what was wished and hoped for, a glance at it cannot fail to convince any one that those who attended were well repaid in knowledge acquired, inspiration, encouragement received and pleasure obtained from mingling with those engaged in similar lines of work.

This should annually be the largest meeting of farmers held in the State for the study of strictly agricultural problems, and all farmers who can possibly do so should certainly attend and take their families. The program for the women was also an attractive one, and with all members of the family thus provided for, this State Convention should be made the occasion for giving all the grown members of the family an annual trip combining pleasure and profit at a minimum cost.

In a report of this kind it is manifestly impossible to give a complete statement of the proceedings of the Convention. The many most excellent discussions, and also a large number of the splendid addresses or lectures, are of necessity omitted. As an index of the character of the work of the Convention, the program which was carried out is reprinted here and a few of the lectures available are also given in this report:

PROGRAM FIFTH ANNUAL MEETING NORTH CAROLINA STATE FARMERS' CONVENTION, NORTH CAROLINA COLLEGE OF AGRICULTURE AND MECHANIC ARTS, RALEIGH, N. C., AUGUST 28, 29, 30, 1907.**WEDNESDAY, AUGUST 28.****MORNING SESSION.**

Call to order by President Ashley Horne, Clayton.

Invocation by Dr. A. H. Moment, Raleigh.

Address of Welcome by Governor R. B. Glenn.

Address of Welcome by Dr. George T. Winston, President North Carolina College of Agriculture and Mechanic Arts.

Response to Addresses of Welcome by Hon. E. F. McRae, Robeson County.
President's Annual Address, Ashley Horne.

AFTERNOON SESSION.

Address by Hon. J. Bryan Grimes, Secretary of State.

Orchard Cultivation and Management, by W. N. Hutt, Horticulturist, State Department of Agriculture.

Propagation of Tree Fruits, by F. C. Reimer, Assistant Professor of Horticulture, North Carolina College of Agriculture.

Wheat Culture, by F. T. Meacham, Superintendent Iredell Test Farm, State Department of Agriculture; R. W. Scott, Alamance County, opened the discussion on Wheat Culture.

NIGHT SESSION—FARMERS' INSTITUTE.

Co-operative Demonstration and Experimental Work between State and Federal Agricultural Institutions and the Farmers, by T. O. Sandy, President Virginia State Farmers Institute.

DISCUSSION.

How can the Farmers' Institute be made more effective in my County?

Chairmen of County Farmers' Institute Committees and others interested in the Institute work discussed this subject.

The Women's Institutes: How can the Farm Homes be made More Attractive and Better. Discussion led by Mrs. Sue V. Hollowell and Mr. C. C. Moore.

THURSDAY, AUGUST 29.

MORNING SESSION—OATS AND CORN.

Growing Truck Crops for Market, by R. S. Mackintosh, Professor of Horticulture, Alabama Polytechnic Institute.

Oat Culture, by R. L. Shuford, Newton, N. C.

Discussion opened by T. B. Parker.

Effect of Good Seed and Variety on Yield of Corn, by C. B. Williams, Director Experiment Station.

Preparing the Land for Corn, by I. G. Ross, Stokes County.

Prof. W. M. Hays, Assistant Secretary of Agriculture, Washington, D. C., being present, was called on and made a splendid brief talk on the Value of Agricultural Experimentation to the Farmers.

Methods of Harvesting the Corn Crop, by A. L. French, Rockingham County.

AFTERNOON SESSION—COTTON.

Preparing the Land for Cotton, by S. H. Hobbs, Sampson County.

Marketing the Cotton Crop, by C. C. Moore, President State Division Southern Cotton Association.

Addresses were delivered by A. J. McKinnon of Robeson County, and J. M. Templeton of Wake County.

The Preparation of Plant Beds and Fertilization of Tobacco, by W. A. Petree, Stokes County.

Seed Selection, by E. H. Mathewson, Appomattox, Virginia.

NIGHT SESSION.

An Address by Hon. W. M. Hayes, Assistant Secretary of Agriculture, Washington, D. C., on "Improvements in Rural Affairs."

FRIDAY, AUGUST 30.

MORNING SESSION—DAIRYING.

An Address by R. H. Gower, President State Dairyman's Association Clayton.

The Breeding and Care of the Dairy Herd, by R. L. Shuford, Catawba County.

Some of the Essentials to Successful Dairying in North Carolina, by J. A. Conover, in charge of Co-operative Dairy Demonstration Work in North Carolina.

Marketing Dairy Products, by B. H. Rawl, Dairy Expert, U. S. Department of Agriculture.

Feeding the Dairy Cow, by John Michels, Professor of Dairy Husbandry, N. C. College of Agriculture.

Prof. Ed. H. Webster, Chief of Dairy Division, U. S. Department of Agriculture, Washington, D. C., was also present and made an address of special interest to dairymen.

AFTERNOON SESSION—LIVE STOCK.

The Place which Live Stock should Occupy in North Carolina Agriculture, by A. L. French, Rockingham County.

The Progress being made in the Eradication of the Cattle Ticks, by Dr. J. A. Kiernan, in charge of Federal Tick Eradication in North Carolina and Virginia.

How can the Feeding of Beef Cattle be made Profitable in North Carolina, by Tait Butler.

WOMEN'S DEPARTMENT.

PROGRAM.

WEDNESDAY MORNING, AUGUST 28.

Opening Exercises of Convention.

THURSDAY MORNING, AUGUST 29.

Address of Welcome by Mrs. W. S. Primrose, Raleigh.

Response of Miss Josephine Scott, Mebane.

President's address (Women's Organizations) by Mrs. F. L. Stevens, Raleigh.

Women's Branch of the Farmers' Institute, by Dr. Tait Butler.

FRIDAY MORNING, AUGUST 30.

Women in the Farm Home, by Mrs. W. R. Hollowell, Goldsboro.

Farm Literature, by Mrs. Walter Grimes, Raleigh.

The Economy of Food, by Miss Mae Card, State Department of Agriculture.

SPECIAL FEATURES.

EXHIBITION OF DAIRY OPERATIONS AND EQUIPMENT.

On Thursday and Friday mornings, from 7:30 to 9:00 o'clock, Professor John Michels ran the dairy in the basement of the Agricultural Building for the benefit of those interested in modern dairy operations and equipment.

STOCK JUDGING.

On Friday morning, from 8:00 to 9:00 o'clock, Professor Michels gave a lecture and demonstration in judging dairy cattle—in the basement of the Agricultural Building.

PRIZES FOR BUTTER.

The prizes offered by the Convention for the best pound of butter made and exhibited by any dairyman in the State were won as follows:

First—A. C. Green, Wake County, score 93; prize \$5.

Second—John W. Robinson, Catawba County, score 90; prize \$3.

Third—J. S. Ballentine, score 88; prize \$2.

LECTURES DELIVERED AT FARMERS' INSTITUTES.

On the following pages are several of the lectures delivered at the institutes during 1907. They are necessarily more or less condensed, and in being reduced to paper have lost much of the interest which they possessed when spoken:

PREPARING THE LAND FOR AND FERTILIZING COTTON.

By R. J. REDDING, Formerly Director Georgia Experiment Station.

In view of the great value and importance of the cotton crop, it is extremely desirable that the very best varieties of cotton and the most skillful methods of culture and fertilization shall be discovered and developed, to the end that the producer of cotton shall be able to meet the ever-increasing demand at a reasonable profit to himself.

It may not be denied that the practical problem that first presents itself to the cotton grower is how to produce cotton at the lowest cost, so that there shall ever be a liberal margin between the cost of production and the market price.

The main purpose in this talk is to discuss the best methods of cotton culture, whereby an ambitious farmer may approximate the production of one bale, or more, per acre at a cost not greater than five or six cents per pound, or even less than five cents. The reader will note that the argument constantly leads in the direction of lessening the cost of production. All efforts to advance the market price in the past have failed, and must of necessity fail, except so far as in the securing more correct and reliable information in regard to supply may cause an upward reaction. The market price is mainly controlled by the law of supply and demand. The farmers might reduce the production (the supply) by curtailing area, and thus cause an advance in market prices; but such advance would be in obedience to the law of supply and demand. So the individual farmer is not able to influence the market price by so much as the thousandth part of a farthing. But the individual farmer may, in very large degree, control or limit the cost of production of his own crop. Not by cutting the wages of labor; not by using cheaper mules, and cheaper or worn-out implements; not by foregoing the use of commercial fertilizers, nor even reducing the quantity he will apply per acre. No, not by one of these short-sighted, if not foolish things, but by using the best of everything, the most effective implements, the most judiciously balanced home-mixed fertilizers in liberal amounts per acre, and in doing these and other things in the most intelligent and skillful manner, aiming to greatly increase the yield per acre, thus making labor (the most expensive factor in production) far more effective and productive.

ROTATION OF CROPS.

It is of prime importance in all mixed farming to adopt a judicious rotation system. It will hardly be expressly denied that such a system yields the best and most profitable returns in the long run; but it is a fact that the large majority of Southern farmers utterly ignore it in practice. It is perhaps not necessary at this time to argue in favor of rotation of crops, but simply to exhort farmers to adopt it in their practice and to indicate the most convenient and effective system for mixed farming in the cotton region.

The three principal field crops grown in the South are small grain, corn and cotton. Perhaps it were better to say that small grain *should* be one of these

principal crops, for as yet a very much smaller area is planted to oats and wheat combined than to corn, and it is still smaller in comparison with the area devoted to cotton. Of course, reference is here made only to the distinctively cotton-producing sections. Including, then, these three crops—small grain, corn and cotton—what is called a “three-year shift” will be in order, and the following succession is recommended:

First Year—Small grain, chiefly oats sown in the fall on the “open furrow” system. The oats should be liberally fertilized, and after harvesting the crop the land should be sown in cow-peas, to be also liberally fertilized, and the vines converted into hay.

Second Year—Cotton to be liberally fertilized with a properly balanced fertilizer, and followed in the fall by a cover crop of vetch, crimson clover, rye or other suitable winter-growing crop.

Third Year—Corn to be only moderately fertilized on hill uplands, and cow-peas to be sown interculturally, either when the plants are about knee-high or at the lay-by plowing. The corn should be cut and shocked and the stover shredded. The peas should be either gathered for seed or pastured off when practicable. This completes the “three-year shift,” the terms of which may be modified or varied according to circumstances and locality.

SOIL AND PREPARATION FOR COTTON.

Of course, in a regular system of rotation the character of the soil best suited to each crop cannot receive much consideration. Fortunately, the three crops—not including wheat—are practically interchangeable, so far as the character of the soil is concerned. Any may be successfully produced on a soil that may be better adapted to one of the others. It may be well to say, however, that the gray, gravelly soils—those that are underlaid by yellowish clay—are better suited to cotton than to either corn or the small grains.

In the rotation above suggested cotton will be generally planted on the fields that were in small grain and cow-peas the preceding year. The first step in the preparation of these fields for cotton will be to turn over the stubble with a two-horse plow, or a disk plow, to the depth of eight to ten inches. This should be done immediately after the first killing frost, or early in November, the effect being to facilitate the decay of all vegetable matter left on the surface by the preceding pea crop. At this time rye may be seeded on the broken surface as a cover crop, to take up the unassimilated plant food left in the soil and to prevent undue washing during the winter. This cover crop will need to be turned under not later than March 15th to April 1st, in order to get the soil in the best condition for the coming crop of cotton.

SUBSOILING.

As a rule, subsoiling in the South has not been found a profitable operation. It is a popular fad with some writers, one of the *hand-overs* from a former generation. Moderately deep plowing and thorough disintegration of the soil is to be insisted on, say to a depth varying, according to the depth of the soil, from five to ten inches. The shallower depth applies to thin soils of light character and underlaid by poor sand or clay. This latter variety should be plowed an inch or so deeper every year, throwing up a small portion of the clay and incorporating the same with the soil, until a plowed depth of eight or ten inches shall be reached.

FERTILIZERS AND THEIR APPLICATION.

The most important point to be considered is to secure the proper ingredients at the lowest cash prices for mixing at home, according to approved formulas. The ready-mixed commercial fertilizers sold throughout the South are generally of good quality; but they are often badly balanced, and therefore not suited in their composition to the crops to which they may be applied. Cotton requires, for best economic results, a different fertilizer from one that is best adapted to corn or to oats. This fact is too often ignored, or very

lightly considered. As a rule, farmers should buy the "raw materials"—acid phosphate, cotton-seed meal, tankage, nitrate of soda, and potash salts, and do their own mixing. They will thus not only be able to mix according to approved formulas, but they will find that the home-mixed goods will cost from three to five dollars less than the price asked for ready-mixed or manipulated guano. Any intelligent farmer, if he knows what material to buy, may make as good, and certainly a better balanced, fertilizer than a majority of the brands on the market.

According to long-continued field tests made at the several Experiment Stations in the South—particularly at the Georgia Experiment Station—and the confirmatory experience of many farmers, a fertilizer for cotton on the average worn uplands of the South should contain the three "valuable elements" of plant food in about the following proportions: Available phosphoric acid, $3\frac{1}{2}$ parts; nitrogen, 1 part; potash, 1 part. Raising the terms to a higher degree, these proportions are precisely the same as: Available phosphoric acid, 10 per cent; nitrogen, 3 per cent; potash, 3 per cent.

So, in the ordinary statement prevalent among fertilizer dealers and farmers, a proportion of 10-3-3 may be adopted as a high-grade, standard formula for cotton. Lower grades, preserving practically the same ratio, will answer just as well, provided a larger application per acre be made in inverse proportion to the grade or quality. To illustrate, the following analysis would prove precisely the same proportions: 9-2.70-2.70; 8-2.40-2.40; 7-2.10-2.10; 6-1.80-1.80; 5-1.50-1.50.

In order to get the same results on a crop with either of the above analyses it will be only necessary to apply an amount inversely proportioned to the grade. For instance, it would require 1,000 pounds of the 5-1.50-1.50 formula per acre to supply the same amount of plant food to the acre as would be supplied by 500 pounds of the 10-3-3 formula. As a rule, however, it will generally be found advisable to buy high-grade ingredients and produce the higher formulas, because the freight rates are the same on the low as they are on the high-grade ingredients.

When very moderate or light fertilizing is intended—as on fresh or new soils, bottom lands, etc.—the above formula may be modified according to the supposed exigency of the case, reducing the proportion of nitrogen and potash, or even applying acid phosphate alone. When liberal amounts of fertilizers are to be applied the general rule should be to *fertilize the crop, and not the soil*.

INGREDIENTS.

The proposition can be maintained that with acid phosphate of any grade, cotton-seed meal and any potash salt—these three ingredients—any desired formula may be constructed, suited to any crop and to any soil whatever. Acid phosphate stands by itself; there is practically no substitute for it. Instead of cotton-seed meal, several other nitrogenous ingredients may be substituted as convenience or cost may dictate, such as tankage, dried blood, nitrate of soda, sulphate of ammonia, etc.; but in the South, fortunately, cotton-seed meal is almost always cheaper and more convenient than any one of the substitutes just named. Instead of muriate of potash, sulphate of potash, kainit, sylvinite, or other potash salt may be used, but as a rule, the muriate is the cheapest source of potash, as well as being high-grade.

So, then, acid phosphate, cotton-seed meal and muriate of potash may be considered as the three standard fertilizer ingredients for the use of the cotton grower in compounding his fertilizers. In what proportions should they be mixed in order to secure a formula 10-3-3, or any lower, relative formula. In practice the three standard ingredients cannot be mixed so as to secure so

high a grade; but, as has been shown, a lower grade will do just as well. The following formula will approximately secure the desired proportions, viz.:

Formula for Cotton.

Acid Phosphate (14 per cent).....	1,000 pounds
Cotton-seed Meal	671 pounds
Muriate of Potash.....	74 pounds

Total 1,745 pounds

The above would analyze about as follows:

Available Phosphoric Acid.....	8.97 per cent.
Nitrogen	2.69 per cent.
Potash	2.69 per cent.

This would be nearly the same as 9-2.70-2.70, and might easily be made identical by adding a few pounds more of acid phosphate.

Of course, with a higher grade of acid phosphate (which is preferable) the same formula may be secured; for instance, of a 16 per cent acid phosphate only 875 pounds would be required.

HOW MUCH FERTILIZER.

It is a sound policy as a general rule to apply liberally. Cotton is a crop that is peculiarly responsive to fertilizers. It occupies the land from planting to the close of harvesting—during a period of from seven to nine months, varying according to latitude and altitude, measuring the space between the last killing frost of spring and the first freeze of winter. Its growing and maturing period is from six to eight months long. Its fruiting period commences with the first blooms, which appear about sixty days from planting the seeds, and continues effectively until about September 1st—about ninety days. So long a flowering and fruiting period makes it one of the most certain of crops, and one well adapted to withstand or recover from the effects of casual and temporary unfavorable conditions. For these reasons it is peculiarly adapted and responsive to high fertilizing, and it is manifestly good policy, while increasing the direct product of the soil itself by the best preparation and tillage, to also greatly increase the amount of that portion of the product that may be the effect of the fertilizers applied. It has been found, however, that the per cent profit on the fertilizer gradually and regularly decreases as the amount and cost of the application per acre increases. So, there is a limit to the amount of fertilizers to be applied beyond which it is not expedient to go, as a general rule. This limit may be stated as from 600 to 1,000 pounds of high-grade fertilizer per acre, or from 60 to 100 pounds of available phosphoric acid; 18 to 30 pounds of nitrogen; and 18 to 30 pounds of potash, the whole costing from six to ten dollars per acre. Much more than the higher amounts above given have been frequently applied with very satisfactory results.

MODE OF APPLICATION.

Amounts less than 1,000 pounds per acre, of the materials recommended, may be safely and are preferably, except possibly in very light sandy soils, applied in one or two furrows immediately beneath the rows of cotton plants, taking care that the fertilizer so applied shall be well mixed with the soil of the furrow or furrows into which it shall be deposited. Broadcast applications of commercial fertilizers are generally much less effective and profitable, and must be considered as wasteful, and therefore inexpedient.

The land having been previously prepared by plowing flush furrows with a wide shovel, should be laid from three to four feet apart, as the foundation of the beds on which the seed are to be planted and the plants are to stand. The fertilizer should be applied in these open furrows and well mixed with the soil thereof by running once or twice in them with a coulter or long scooter. Then "list" with two furrows of a turn plow. The fertilizers should be ap-

plied not less than two weeks before the date of planting. Shortly before this last date the beds should be finished, and just ahead of the planter they should be made smooth and mellow, and somewhat reduced in height, by the use of a common harrow.

It should have been stated before that divided doses of fertilizer have not been found effective, excepting that a small portion of the fertilizer, say 40 to 100 pounds per acre, may be reserved for applying in the seed furrows at the time of planting. Perhaps a better plan is to apply a little nitrate of soda, say 25 to 30 pounds per acre, in the seed furrow. This seed furrow application will cause a vigorous development of the seedling plants, bring them forward to thinning time more rapidly, enable them to better stand unfavorable conditions and to resist the attacks of lice and other insect enemies. Its remoter effect is to encourage more rapid growth during the early stages, and to that extent hasten maturity.

COTTON CULTURE.

By W. J. McLENDON, Anson County.

The subject I propose to discuss with you to-day is cotton culture. The fact that the Southern States produce three-fourths of the cotton that clothes the world makes it a live subject, and one that deserves our careful study. As cotton planters, we are confronted by conditions to-day that a few years ago were unknown; then labor was cheap and plentiful, and forty acres, a nigger and a mule was the slogan; to-day we have the mule and forty acres, but the nigger is gone, or worthless. Now, how are we to overcome this labor problem, cultivate our lands and hold the monopoly as a cotton country?

To the solving of this problem let us now direct ourselves. The first step in cotton culture, under existing conditions, is the proper preparation of the land. Say we have our lands divided into suitable sections, and we wish to use one section for cotton next year, then begin the preparation by growing small grain of some kind, following with peas, using 400 pounds of ash element per acre, put in broadcast or with drill, and one to two bushels of peas per acre. When the peas are beginning to ripen, if you have stock or can purchase some to consume the hay, cut the peas and feed to stock, taking good care of the manure, and apply to land. This is the most profitable way to use the pea crop; but if you have no stock, and won't buy, then turn under after frost all the peas, grass, etc., thus putting into your land vegetable matter that will be converted into cotton and pay a large dividend on the investment. Never, under any circumstances, mow the peas from the poor places in the field. Your purpose should be to have your fields of a uniform fertility, producing cotton of equal size and fruitage, upon each acre; so look carefully after the poor spots.

The best plow that I have any acquaintance with is the Reversible Disk. It turns any stubble that may be on land, giving it a rotary motion that mixes the stubble soil and subsoil as no other plow does. Plow the land about two inches deeper than it was plowed last. Follow plowing with half bushel of rye, harrowed in, per acre. Next spring, when the land is dry enough to work, and before the rye begins to head, take a disk harrow and sharpen each disk well, then set disk to run about three inches deep and run it over the rye. This cuts it up and works it into the land; in about one week run harrow in opposite direction, setting disks to run five to six inches; in many instances two harrowings will do; sometimes and on some lands it will take three. This is all the work that is necessary before putting in fertilizer.

Use as much fertilizer as you are willing to buy, based upon the amount of vegetable matter turned under and the general fertility of the soil not to exceed 1,000 pounds per acre, unless the land is rich. Poor land devoid of humus will not bear heavy applications of commercial fertilizers. Quite a large amount of fertilizers are lost each year by such methods.

Cotton rows as a general rule, should be about four feet apart. Open furrow and on sandy land put about half the fertilizer in drill and apply remainder during cultivation of crop. On stiff and clay lands the whole amount can be used before planting. Where more than six hundred pounds of fertilizers are used, I prefer to use two-thirds the amount broadcast and harrow in before laying off rows; balance in opening furrow. Cover with disk harrow, throwing all the dirt to the center. This at one trip makes the ridge upon which the cotton is to be planted. This can be done with a reversible disk harrow, which I think is the best harrow on the market. It does all the work a non-reversible one will do and many other kinds that a cotton grower is in need of.

Any good planter is all right; use on sandy and light lands from one to one and a half bushels of seed per acre; on stiff lands two bushels. The variety of cotton you plant should be determined by character of soil and location. In the central and eastern part of the State the big-boll varieties have proven to be the best, such as Russell's or Culpepper's; in the western part of the State King's improved has given best results.

When you see the ground begin to crack along the rows, then commence the cultivation. Do not wait for the cotton to come up. Where you have crust formed by rains, run across the rows with a light iron-tooth smoothing harrow with teeth set so they will not drag up the cotton. In four to six days run diagonally across the rows again, and repeat in a few days, going in opposite direction; now take the weeder and run it straight across the rows, then diagonally in both ways, going over once a week until the cotton is four or five inches high. If this work is well done it needs no hoeing up to this time. Now, go over with hoes, thinning to stand and clearing all grass left by harrow and weeder. On light lands and where there is no crust use the weeder from the start. After hoeing, if your land is such that cultivators can be used, by all means use them; cultivators that will work a row at one trip; use these as long as you can straddle the cotton, then finish with the open and shut kind; they will plow a middle at one trip. All cultivation should be shallow, deeper when the cotton is small, using great care not to break the small feeding roots as they extend through the land. They are doing the work for you, searching for plant food in every square inch of soil, so break as few of them as possible. Keep the middle clear of grass at all times.

How late we can cultivate cotton depends upon the season, sometimes the last week in July, at others keep it up until middle of August. Every man must be the judge of his farm. Crops can be saved from ruin at times by breaking the crust and stopping the evaporation of the water, allowing the cotton roots to get it instead of the air.

I have given a plan for the cultivation of a cotton crop of a normal year; this will have to be changed under unusual conditions; for instance, if you have much rain about and just after the cotton comes up, and the grass gets two to three leaves, then the harrow and weeder will have to be laid aside and other tools used. In this selection the judgment of each farmer must be brought into use, excessive rains or prolonged drouth must be counteracted by brain force as well as muscle, and it must be the brain of the man on the farm.

My friends, I wish to talk to you a few moments along some general lines, not specially cotton culture, but something so closely related that we cannot ignore them and make a success of growing cotton. The first thing is this: have a high ideal before you and bend every energy to reach it; this ideal should be a rich body of land that you cultivate. I mean by rich land, a farm that will produce not less than one bale per acre, and other crops in proportion. To have this requires two things, deep plowing and a plenty of vegetable matter. No farmer should be contented until he has a soil fifteen inches deep full of vegetable matter; when he has this he will begin to both farm and live. There will be pleasure and profit in farming. Now, you cannot take an average farm here and do this with the tools in common use. Every man who has ever been struck in the stomach with the handle of a boy Dixie plow never wants to see another; and it will be a great day for our farmers when they put them aside.

You will notice that I recommend a reversible disk plow. I do this for the reason that one man with three mules can do work that will soon give you

the fifteen inches of soil, and at the same time do it with ease, riding instead of walking; same with the large smoothing harrow and reversible disk harrow and cultivator. We must use more mule muscle and less man muscle. Mule is cheaper. It takes twenty-one years to grow a man, and you can grow seven mules in that time, allowing three years to each mule. Plow deep, fill your land with vegetable matter, grow from one to three bales of cotton per acre and grow rich. Paint your houses and put water in them, give to the wife and daughter every convenience science and skill has made to the present time. lighten their burdens, be a happy man in the midst of a happy cultured family.

These are some of the good things rich land and energy directed by a well-cultivated brain will bring into your home.

OAT CULTURE.

By R. J. REDDING, Formerly Director Georgia Experiment Station.

The value and great importance of the oat as a feed for growing and working animals has never been properly appreciated in the Southern States. It may be well as a matter of comparison to give the digestible nutriments of Indian corn and oats, as follows:

	Proteins.	Carbo-hydrates.	Fats.
Indian corn	7.96	66.7	4.3
Oats	9.20	47.3	4.2

It will be observed that oats contain 9.20 per cent of proteins, or flesh-formers, against 7.96 per cent in corn. The fat in each is nearly the same, while corn has 66.7 of carbo-hydrates against 47.3 in oats. W. A. Henry, in "Feeds and Feeding," says: "As a result of feeding experiments at Hoheheim, Wolff concludes that in feeding work-horses 4 pounds of oats are equivalent to 3.5 pounds of field beans, and 4 pounds of beans are equal to 3.5 pounds of corn.

In view of the value of oats as a feed for horses and mules, it may well be asked, why do not the Southern farmers rely more upon oats and less upon corn as a feed for their work animals? One reason for giving corn the preference is the alleged uncertainty of the oat crop, because of winter killing, if the seeding be done in the fall, and the liability either to rust or injury from drouth if sown in the spring. But farmers do not give the oat crop a fair chance. I have no doubt that a large proportion of the seed oats that come to us from the States of Missouri, Kansas and other States north and west of us is from spring-sown crops. My observation is, that of a variety of oat that has been sown successively and for many years in the spring, the plants will have in a large degree lost their power to resist cold. I consider it of vital importance to sow only seed whose history is well known, or reliably avouched, on these points. Yet it is a fact that many a farmer, after a spasmodic effort to grow a crop of oats, and with a fair degree of success, will fail to save seed, and will rely on "gitting me some seed oats" when the time to sow has arrived.

Under these circumstances it is not surprising that the oat crop of the South is so insignificant in area, yield per acre and quality, and that it is not a more popular crop.

I wish to say just here that, under proper conditions, most of which are under our control, or subject to modifying precautions, the oat crop may be made a more certain crop than corn on the ordinary upland soils of the South. Although not able to present close statements of comparative yields of these two cereals, I will say that my experience of the last sixteen years warrants the statement that, "one year with another," the yield in weight of clean oats will exceed that of corn on the same or simular soil by about 14 per cent. In

other words, for every bushel of 56 pounds of corn there would be a yield of two bushels, or 64 pounds, of clean oats. Moreover, the two bushels of oats will not have cost more than one-half as much per bushel as the cost per bushel of the corn. To put it still clearer: Suppose the one bushel of corn cost 28 cents to produce it, or 50 cents per hundred pounds, then the two bushels of oats will cost not more than 14 cents per bushel, or about 43 cents per hundred pounds.

But one of the signal advantages of oats is the fact that, being ready for the harvest in May or early in June, a full crop of cow-pea vines may be grown on the same land as a catch crop. The value of this advantage is not easily over-estimated. It is true that occasionally, in spite of close attention to the details necessary to success, a crop of oats may prove a more or less failure. But it may be affirmed that the oat is not really more likely to fail, nor will it fail oftener in the long run, than will a crop of corn. Since the introduction of the rust-proof varieties oat rust is rarely heard of except on the farms of those farmers who insist on sowing such varieties as "Winter Turf," and the like, or some nondescript variety bought from the grocery, or from some feed and forage merchant who knows nothing of the origin and quality of the seed he sells.

I come now to speak of the

TIME TO SOW OATS.

One year with another a well-sown fall crop will nearly double the yield of the same land sown of the same variety of oats in the spring. According to my experience, the best time to sow is during the month of October, varying somewhat according to latitude.

TO PREVENT BLAST IN OATS.

For 50 bushels of seed oats dilute one pint of formalin with 50 gallons of water. Spread the oats on a tight floor or a hard, clean surface of soil, to a depth of 3 or 4 inches and sprinkle the diluted formalin over the same. Shovel over the mass until every grain shall be well moistened. Leave the whole in a compact heap for two hours. Then sow at once (or within a few hours), or spread the oats thinly and dry them for future sowing.

HOW TO SOW.

I come now to the most important detail of oat culture—how to sow. On the Georgia Experiment Station Farm we commenced experimenting in methods of sowing as far back as 1890. Among other methods was sowing the seed in furrows 18 to 24 inches apart, made with an ordinary scooter plow. I cannot do better than quote directly from a bulletin published by the Georgia Station, September, 1899, as follows:

"On the Station Farm we have found, even when the drills were laid two feet, or one and a half feet apart, using a common scooter plow, or better, a single-row fertilizer and seed-distributor, that oats so sown always produce a larger yield than when sown broadcast and harrowed in. But a more important discovery is the fact that when the seed are sown in open furrows and barely covered, leaving the furrows open or unfilled, the oat plants are very much less liable to be killed by a severe freeze. The idea was conceived several years ago, and annually since we have sown the larger portion of the fall-sown area in drills, 18 to 24 inches apart, latterly using a Gantt fertilizer-distributor. This sows but one row at a time, has no covering attachment, but simply opens a small furrow and sows the seed, the single wheel following in the furrow and barely covering the seed and pressing the soil. (The Gantt Manufacturing Co., Macon, Ga., now makes a double-spout distributor, which sows the seed and fertilizer at one operation). The result is the plants come up one and a half or two inches below the general surface, and the "crown" of each plant is formed and established, say two to two and a half inches below the general surface. The winter rains, light freezes and thaws gradually,

but only partly, fill in the open furrow, and the more vital and sensitive parts of the plants are left at the original depth, below the reach of even very severe freezes.

"The long-anticipated freeze at last came and our theory was put to a crucial test. On February 8, 1899, the thermometer sank to 15 degrees, followed on successive mornings by 19 degrees and 17 degrees. On the 12th it was down to 11 degrees, and on the morning of the 13th stood at 7 degrees below zero, the coldest day since February 8, 1835. The result was that fall-sown oats and January sown oats were pretty generally destroyed everywhere. But our open-furrow drilled oats, excepting two acres, stood the test remarkably well, and, though seriously injured, made 40 bushels to the acre. Of the two acres so planted that were badly killed, the rows were laid east and west; of all the other sections the rows were laid north and south; thus developing another significant fact that the ideal direction would be northeast and southwest, in order to protect the plants by means of the wall of earth, against the north-west wind.

"In order to make more sure of the correctness of the preconceived theory that the open furrows would secure the oats from fatal freezing, on two one-acre sections that were sown in open furrows running east and west on every alternate tenth acre the furrows were filled up flush by running over them with a clod-crusher and smoother. The result was that the oats on these alternate tenths were almost entirely destroyed, not one plant in ten surviving the severe freeze, and the plots were resown with spring oats. But the other tenths, of which the furrows were left open, although severely injured, produced 40 bushels of grain per acre, or more than half of the expected full crop.

"When carefully drilled, one and a half to two bushels of oats are sufficient for an acre; when broadcast, from three to four bushels of the same oats are required for one acre, in order to secure the same stand." This alone is an advantage in favor of the drill-sowing that would result in a saving of seed oats sufficient in value to pay for the extra labor of sowing by this plan.

It may be well to remark that a very low temperature is by no means the sole factor controlling the effect of cold on a crop of oats. The results of a freeze will depend very materially on the weather for a week or two preceding, and on the condition of the oat plant. A moderately cold snap, say a minimum temperature of no lower than 15 degrees, may prove fatal to a crop of oats sown in the ordinary way, providing such drop in temperature shall immediately follow a spell of mild weather, inducing a tender, succulent condition of the plants. As a rule, a very much lower temperature will be required to injure oats in January or February than would suffice to utterly destroy them in March.

I was about to forget to say that I advise and practice the system of rotation—cotton, corn and peas, oats and peas—which requires that oats be sown on corn land, from which the cornstalks have been cut and shocked. Such land is deeply plowed as soon as possible after cutting and shocking the corn, and thoroughly harrowed. It is then ready for the oat drill.

FERTILIZING.

So far as I am informed, it has not been definitely determined by any one just what are the proper proportions in which the three principal elements of plant food should enter into a composition of a fertilizer for oats. The general trend of our experiments indicate that the oat demands a very liberal percentage both of nitrogen and potash, in fact a much larger percentage of both of these elements than seems required for best results on corn. The following formula has been used by me for several years, the amounts being for one acre:

Formula for Oats—One Acre.

Acid Phosphate	200 pounds.
Muriate of Potash (or Kainit 200 pounds).....	50 pounds.
Cotton-seed Meal	250 pounds.
	<hr/>
	500 pounds.

The above is to be applied at the time of sowing the seeds in the fall and a top dressing of 50 to 75 pounds of nitrate of soda to be applied in March.

I may add that in soils that have been very considerably improved by a regular rotation of crops, the quantity of cotton-seed meal may be still further reduced, say 150 pounds, in the fall, to be supplemented in the spring by such amount of nitrate of soda as may be judged necessary. The need for additional nitrogen in the spring may be judged by the appearance of the plants, with a fair approximation to accuracy. If the plants are of a rather pale green color, and especially if they show a yellowish tinge, it may safely be assumed that a top dressing of nitrate of soda is needed, the amount to be also determined by the judgment of the farmer, but rarely exceeding 50 or 75 pounds per acre.

SOME SUGGESTIONS FOR THE IMPROVEMENT OF FARM HOMES.

By FRANKLIN SHERMAN, Jr., Department of Agriculture, Raleigh.

INTRODUCTION.

Fifteen or twenty years ago, it might have been thought entirely inappropriate to discuss a subject of this sort at our Farmers' Institutes, and no one realizes better than I the fact that for many long years the simple problem of securing bread and meat has been the leading one with our country people, and there was neither time nor money to devote to the beautifying of the home. It is for this reason, and because I might by some be accused of discussing a subject that is not "practical," that I have ventured to discuss it only after the most careful deliberation. We are here to consider our own home affairs, and the matters which I shall mention bear directly on conditions as they actually exist in our State at the present time. I do not wish to say anything to hurt the feelings of anyone, and if I touch any tender spots, remember that I wish to do so in kindness, just as the most gentle doctor may have to feel the painful fracture before he can set the bone.

If conditions were still such that the majority of our people could not afford to live comfortably, if there were no remedy available for the evils which I shall mention, it would be cruel of me to say anything about them; but, if you will make inquiry at the country banks all over our State, you will find that there is more money on deposit to the credit of our farmers than ever before. The prices of the common farm products, such as cotton, peanuts, wheat, meat, eggs, poultry, fruit and vegetables, have averaged so high in recent years that those farmers who have mastered the art of *economical production*, by rotation of crops, deep plowing, use of stable manure, the intelligent use of commercial fertilizers, use of good seed, and other like methods, are making a very gratifying profit. Positive evidence of this is abundant in all sections. In the seven years that I have been in North Carolina, I have seen many farmers build new homes, and the new ones are almost invariably larger, brighter and better in every way than the old ones. But this evidence of progress should not bring us to stagnate, in the idea that we are already doing well enough. Rather it should create within every one of us a healthy and generous dissatisfaction, a dissatisfaction which shall be pacified with nothing less than good homes, not only for ourselves, but for every neighbor as well. A young dairyman once wrote me: "I intend to have just as good a barn as Mr. *Anybody*"; and I wish that our people would make that same determination with regard to our homes. Do not think that I would advise anyone to attempt to live beyond his means, but I do plead that the home life of every family be made just as bright, happy and attractive as the means will permit.

UNDESIRABLE CONDITIONS.

What are some of the conditions in the home-life of our people which are calling for attention? Remember that my fight is not against *unavoidable* poverty, but only against the hard conditions of life which can be *remedied*. I have been in more than one farm-home where at meal-time the children lined up at the table on a bench without a back, which they had to step over, or squeeze around the end, in order to get to their assigned places, and in order to get away from the table again each child (unless he be on the end seat) must choose between swinging his feet up and around almost into the faces of his brothers and sisters or turning a sort of backward summersault. This may be a slight exaggeration on the truth as to the method of escape, but it is no exaggeration on the seating arrangements as found in many of our homes, even of those who could afford to do much better. A separate chair, even though a cheap one, for each person would be much better.

Upon one occasion I was in a home in this State to take dinner. The house was old and in poor repair, and I suppose it was out of courtesy to the company that the children were given the poorer places at table. Be that as it may, a ten-year-old boy sat down in his chair (he had a chair) and simply leaned his back against the back of the chair as if to rest—did not tilt the chair at all; but the floor beneath was so uneven and the chair so rickety that it fell over backward, and he was reproved for his carelessness.

I have been in many a farm-home where the cracks in the floor allowed too free and too unhealthy ventilation. We speak of our mild and healthful climate and our good winter season, but I spent a winter in Canada two years ago (1905-'06), and wish to tell you that in my candid opinion the people in the region where I was suffer less from cold in the winter than our people do in this State. The houses are built warmer, provided with extra doors and shutters; the winter season finds a huge wood-pile at the back door, and the cold season, always expected and even hoped for, finds the thrifty Canadians prepared to make it the leading season for home comforts and social gaiety, as indeed it is.

Any of you may find homes, I am sure, where you may know, judging from the size of the family and the size of the house, that when night comes the children are crowded three or four in a bed, and then probably some others scattered about on mattresses or blankets on the floor. And how frequently we see houses of the poorer class where the space left by the breaking of a window-pane is filled with an old pair of dad's last year's breeches. Let consumption or some other deadly infectious disease get into these unsanitary homes and we find one after another dying of the affliction, until the distracted mother and father conclude that the hand of the Lord is heavy on them, when in reality the affliction is the inevitable result of simple ignorance or wilful neglect.

These matters I bring to your attention to show that there is much need for us to improve our homes with reference to physical comfort and health, not to mention the mental development which we will consider later. I know that I have just mentioned some extreme cases, but even our extremes should not be such. We have many very comfortable farm homes, but let not those who live in them imagine that the problems of squalor, poverty, ignorance and indolence are confined to the slums of London or New York.

SOME HOUSEHOLD CONVENIENCES.

Not to encroach on the subjects which are properly discussed by the ladies at their own meetings of the Institute, I wish to mention only a few of the conveniences which the man of the house should insist on providing (always, mind you, *if his means will permit*), for they count in a marked degree for the well-being of the wife who might otherwise deny herself too much. There are three implements which should be in every house where the family does their own work, and these should be of the best make possible to secure. They are: (1) a first-class cooking-range (not a mere stove); (2) a good sewing-machine, and (3) a washing-machine. These cost money, and you must buy them to the best advantage. If you can do just as well with the

local merchant as elsewhere, buy from him, but if you cannot, order direct from the manufacturers, or even from some of the large department stores.

Perhaps it is not too much to suggest that the cook-range should have a large oven, a water-reservoir, and an "indicator" on the front. The indicator is a sort of thermometer on the oven door which shows how hot the oven is—and a housekeeper told me that it saved much blistering of the face which would otherwise be incurred in continually looking in to see how the bread or potatoes were baking. A warming-closet surrounding the pipe is also a great convenience.

The sewing-machine should also be a good one, and this is more important in the country than in the city, since repairs cannot be had so easily. Probably the majority of our country people buy their sewing-machines from agents who drive about with a machine strapped into the back of the buck-board, but when this is done the price paid is necessarily high, for the agent must pay for the horse and vehicle and for his own board and lodging, all from the profits on the machines he sells. If ordered direct from reliable makers, they may be had much cheaper. Farmers tell me that when they buy from agents on the installment plan, as they are often obliged to do, a good machine costs them from \$40 to \$60 by the time it is paid for; but a farmer's wife in Catawba County tells me she bought a \$20 sewing-machine from the makers, has had it twelve years and it is still in excellent condition. Care in buying to the best advantage is just as important an item in your prosperity as is the profitable selling of your cotton, tobacco, peanuts or wheat.

The washing-machine costs less and is bulky, hence you can usually do as well with the local merchant as by ordering it from a distance. Careful inquiry among your neighbors who have washing-machines will show which make will best suit the needs of your home, and having ascertained this, get one just as soon as you can. A good washer and wringer can be bought for from \$8 to \$12, and will save much labor, worry and needless muscle-wear on the housewife.

WATER-SUPPLY IN THE HOUSE.

This is one of the very greatest conveniences, and should, I think, be planned for from the beginning. Unless you have taken the trouble to figure it out, I doubt if any of you have any adequate idea of the time consumed, the distance walked, and the energy wasted in going to and from a distant spring, or in drawing water from a well. At one of these institutes I was told of a case where the woman surprised her husband with the statement that she had walked over 3,000 miles on this one endless errand. In my travels I pass numerous fine homes, the water from which comes from a spring at the foot of a long steep hill. Whether the work of carrying that water is performed by man, woman, child or beast, there is a waste of animal force which should, if possible, be avoided in order that it may be utilized in other directions, for with the wind-mills, hydraulic rams, force-pumps, etc., we can force the water to our houses by the natural forces of air and water at very much less expense. Let us consider briefly some of the means by which this may be accomplished.

Wind-mills.—There are, of course, various makes and styles of these, each manufacturer claiming his as best. Advertisements may be seen in farm papers, especially those published in the central States. Wind-mills are more especially adapted to level sections where the fall of water is not great enough to use a hydraulic ram; hence, for this State, they are best adapted to the eastern section. The cost, which is not so great as one might suppose, depends upon (1) the height it is necessary to have the tower to get the wheel above trees, buildings or other obstructions to wind; (2) the size of the tank, which should be large enough to hold water to last through from one breeze to another; (3) the amount of piping necessary to carry the water to the barn, house, dairy, etc.; (4) the size of the wheel, and (5) the material (wood or steel) of which the wheel is made. There are other factors influencing the cost, but these are the main ones. Allowing for moderate variations in all these, we may say that under most conditions in this State a suitable wind-mill equipment can be put in at from \$150 to \$300. But it should be remembered that the wind-mill is more costly, and as a rule not generally so satisfactory as the hydraulic ram, so that if your location is

such that the ram can be used we would recommend it in preference to the wind-mill.

Hydraulic Ram.—This machine runs by the force of the water itself, hence costs nothing for power, and as the machinery is very simple the whole outfit can be installed at comparatively little cost, the expense depending upon the size of the tank to be supplied, the amount of pipe necessary to convey the water from the source to the house and barn, etc. It can only be used where there is some decided fall at the water source, such as a stream, ditch, or spring brook flowing down a good grade. Such conditions can be found at hundreds of homes throughout the hilly Piedmont and mountain sections of our State, and in these regions thousands of hydraulic rams might be (and some day will be) at work driving an abundant supply of pure water into the homes and barns. To make a *very conservative* estimate of what may be done by the ram we may say it *will raise one-seventh of the supply of water to four times the height of the fall at the source*. In other words, if you have a spring giving a flow of fourteen gallons to the minute, and the stream flows from the spring with a fall of five feet in a short distance, you may, by means of a ram, raise two gallons of the water every minute to a height of twenty feet. Or, if you need to raise the water forty feet to get it to the top of your house or in the tank, it will raise one gallon per minute. I have chosen to be very conservative in this estimate—a good ram will do more than I have stated rather than less—in fact, there are pump dealers and makers who will guarantee better work than I have indicated. Advertisements of hydraulic rams are to be found in all farm papers, or any large hardware or pump dealer will gladly assist you in making a proper investment along this line. Study the matter carefully and when intelligently convinced that you have sufficient flow and fall to operate a ram successfully, go ahead. The total cost will vary from \$50 to \$150, and it will save many times its cost in worry, work, profanity and premature gray hairs. There are, of course, many houses built at the top of high hills where the water cannot be forced by this means, but nevertheless there are thousands upon thousands of homes in this State which are now without this convenience where it could be had at a cost easily within reach of the owners.

Other Methods.—A number of other methods are in use for obtaining water in houses. Cistern water, gathered from a clean roof and carefully screened, is entirely healthful, and even if not used for drinking is excellent for cooking and washing purposes. Water may be run from the eaves directly into a large tank outside, or inside the house, from which pipes may lead to the kitchen or bath-room. Bath-room? Yes, sir, for I think that this is an accompaniment of cleanliness and modern good living that should be in every good farm-house. A force-pump may be employed, by which a pressure of air is pumped into a metal tank and that forces up the water from the cistern or shallow well. One farmer told me that he had a hand-pump on the kitchen porch and his bath-room on the ground floor not more than twenty feet away, and he merely attached a pipe to his pump when he wished to fill the bath-tub. Mr. French, of Rockingham County, tells me of a man who had one of these pole and roller crushers (I don't know the proper name) for grinding sorghum-cane, and geared it so that when the mule was hitched to it and walked around, it worked the pump handle and raised the water to a tank in the top of the house. If there is an old-fashioned tread-mill on the place it may be geared to a similar use; or better still, if the farmer has a good gasoline or steam-engine it will do this work and much other besides.

Enough has been said to show that there are various methods of accomplishing this very desirable result of getting water into the house. Once this is accomplished, it is an easy step to attach a hot-water tank to the cook-range and have both hot and cold water on hand every day in the year for use in kitchen and bath-room. Conditions are so variable on the different farms that no specific directions can be given here that will suit all cases, but with the hints here given any farmer can consult a mechanic, a plumber or a pump dealer and determine with certainty the best method of solving the question of the water supply. I have talked with those in this State who have expended as high as \$400 or even \$1,000 on very elaborate and complete

outfits, but in every case they express the utmost satisfaction when they once get the problem solved and realize the benefits. When an entirely adequate supply of water may be put in the average farm kitchen at from \$50 to \$150, and we still see farmers wasting their money on "more land," while the wife breaks her health and her back dragging water by physical force, we wonder whether after all our much boasted Southern chivalry is showing itself in a proper way! Just think on this a little.

BUILDING A HOME.

Construction.—Some of the younger men in this audience have not yet built homes of their own, but will soon do so, and a word to them may not be out of place. There are certain little ideas which it were well to have in mind from the start. I find many who begin by building merely a little cabin with the expectation of building a larger, good house, a year or two later. Let me beg of you, that whether you build cabin or mansion, determine that it shall be of good material and substantial construction. Smooth, dressed, matched lumber for the floors, tight joints, abundance of windows, rooms enough to give needed privacy to family or guests, a water-proof roof, for always remember that poor crops or financial losses may force you to make your temporary "shack" the permanent home of a growing family.

If you can afford to devote as much as \$800, or \$1,000 or more to your house, I believe it will pay you to get regularly prepared plans by which to build—either go to some good architect in the nearest city, or consult the plans for farm-houses as often published in farm papers or magazines. Some friend or relative who lives in town may be able to give you many useful pointers. Try to get an arrangement which will give the greatest amount of convenience and usefulness and will involve the least expenditure of money, time and labor. The North Carolina Architectural Association has a rate of 3½ per cent on country houses; that is to say, that for the plans and specifications for a house costing \$1,000 the architect will charge you \$35. Well drawn and carefully planned specifications are an economy, for it is the architect's special business to know how to arrange a house so that it shall give the best satisfaction at the cost involved, and his livelihood is dependent on his ability to prepare plans that will give satisfaction. Fancy corners and gables are not needed, but a pantry, a bath-room, convenient stairways of an easy slope and conveniently arranged closets, hallways, chimneys, etc., are essentials worth looking after. By all means have the rooms high and provided with plenty of windows. Let there be plenty of bed-rooms to allow for additions to the household without crowding to an unhealthy degree. Plan for a closet in each bed-room and plan for a good interior finish on the wall and ceiling either of plaster and white wash, or a neat papering. Let's make it a bright and cheerful home while we are at it—one that the little woman will be proud to preside over and not feel obliged to apologize for.

Paint.—The house should be painted by all means. The colors should be simple and harmonious. Dabs and streaks of yellow; green and red do not make a pretty house. It is a good general rule to use only two colors on the exterior of the house, as for example, white for the main painting and dark green for the blinds, mouldings and other trimmings. Any combination that seems suitable and in taste may be used, but avoid overdoing the matter with a gaudy combination of colors. A good coat of paint will not only add to the appearance of the place, but gives it an actually better money value, increases the feeling of comfort and satisfaction of the family, and also will enable the lumber to stand the effects of time and weather better. A prosperous small farmer in Catawba County did a nice job in this matter; having built a very comfortable six-room house, he had it varnished and papered inside, and painted on the outside, the entire work costing him in the neighborhood of \$120. Doubtless he hired the work done, and could have saved some by doing it himself. At any rate, that cost covered *painting, papering and varnishing*, making not only a neat and attractive exterior, but an interior that was bright and cheerful. This man is a poor farmer of only the most moderate means, but he has a correct ideal set up for a nice home, and he is realizing it.

During the past summer (1907) I rode for a distance of about fifteen miles through a typical farming locality in the Piedmont section of the State. As I sat by the car window I made note of the painted and unpainted houses along the way, not counting houses which were evidently of negroes. I noted sixteen unpainted houses to six painted ones. Now, I do not mean to say that every one of those houses should have been painted, for some of the people are not able to afford it—simply cannot do it—but it does seem to me that a larger proportion might be painted. In my trips over the State, I frequently meet people from the West and North who criticise this slovenly habit of leaving our houses unpainted, and I always excuse it on the ground that the large proportion of negro population, who cannot reasonably be expected to have painted houses as yet, causes the whole country to look backward in this respect. This is what I tell them, but we know among ourselves that lots of our white people live in these same untidy houses, and some of them might do better if they only *would*:

Surroundings.—Near at hand to this comfortable farm home should be all the things necessary to supply not only the meagre necessities of existence, but something for mere pleasure as well. Immediately around the front there should be, if possible, a good growth of grass on the lawn, rose-bushes, flower-beds, and enough trees to furnish plenty of shade, at the same time not excluding the sun too much. For the cooler sections, where there is sufficient rainfall, as in the higher Piedmont and mountain sections, many yards are nicely sodded with Kentucky blue-grass, and this remains green practically all the year. In the hot, dry, sandy sections the much-despised Bermuda grass will do well for the lawn, though heavy frost kills it down for the winter. The religiously swept, perfectly bare sandy yards so often seen in the eastern section may suit those who have never seen anything else, but they are an eye-sore to those accustomed to a velvety, green sod. The bare yards may do all right, *if we can't do better*, but the green sod lawn is better if we can get it. For shade trees there is a great variety offered by the nurseryman, ranging in cost from 25 cents to 75 cents each, and some can no doubt find fine young seedling trees along the borders of forests which they can themselves easily transplant. Among the most desirable trees for permanent planting may be mentioned the various varieties of oak, maple and elm. For a very quick grower there is nothing to excel the Carolina poplar, but it is not a good tree for permanent planting.

In planning the home grounds provision should also be made for the location of the garden, orchards, and barns for all the farm animals. Strive to have a full variety of vegetables and fruits in their season, and milk, butter, eggs, poultry, etc., all the year round. How many farm homes there are where the table fare is monotonously the same all the year round.

LITERATURE IN THE HOME.

The man who has provided a good home in good surroundings and furnished it with the best conveniences he can afford, will surely want to provide books and magazines for family reading, and in this matter he cannot afford anything but the best. Cheap love-novels, detective stories, sensational stories of murder, robbery, and horrors of all descriptions, had better be cut out. One good daily paper, if you can afford it, at least two *good* farm papers (whether you think you can afford them or not), one or two monthly or quarterly magazines, all these should be taken if you can possibly afford them. Sometimes your county newspaper can arrange to get you subscription to a combination of several periodicals at a greatly reduced rate, or your farm paper can often arrange it for you. Several neighbors may join in a reading club, each taking one or two publications and then exchange from one to another so that all get the benefits. If possible there should also be a good assortment of books on the shelves relating to various outdoor subjects, as well as a few on history, etc. In short, I should want (always remember, *if I could afford it*) to have at hand the books wherewith my boys and girls might learn something of the flowers, rocks, insects, birds, beasts or other objects around them in which they might find an interest.

The poor farmer may truthfully contend that all these books, magazines and papers are not for him, that he simply cannot afford to take them. To

such, as well as to all others, I would say that there is a great mass of reliable information printed on subjects related to farming which is for free distribution for the asking. The North Carolina Department of Agriculture at Raleigh issues a bulletin every month which is sent to about 30,000 farmers in the State. All you need to do to get this publication is to address a card or letter to "Department of Agriculture, Raleigh, N. C.," ask to have your name put on the mailing-list to receive the BULLETIN, sign your name and address, mail it, and you should thereafter receive it regularly. Of course, mistakes will sometimes occur, and names may be lost, but if you find that you are of a certainty not receiving the bulletins as you should, a polite reminder sent to the Department will receive polite attention. Every wide-awake farmer in the State should be on that mailing-list.

In the same way every farmer should receive the bulletins issued by the Agricultural Experiment Station, West Raleigh. The Experiment Station issues a number of bulletins at irregular intervals each year.

A study of these publications will soon teach you who the officials in the State are who are engaged in different lines of work, and much help may be secured by direct correspondence with them. From the State Department of Agriculture probably not less than 15,000 personally signed letters are sent out each year, not counting circular-letters, and there is no reason why two or three of these letters each year should not be for you. Make use of these institutions which have been created and are conducted for your benefit.

Address a letter to "U. S. Department of Agriculture, Washington, D. C.," and ask them to put your name on the list to receive the Farmers' Bulletins. A large number of these have been issued, and they cover many lines of agriculture. You should get them.

These three separate institutions—the N. C. Department of Agriculture, at Raleigh, the State Agricultural Experiment Station, at West Raleigh, and the United States Department of Agriculture at Washington, D. C.—all issue valuable publications which all of our wide-awake farmers should have, and they may secure them in the way I have mentioned.

EDUCATION.

And now we will suppose that the little ones are getting up to five, six, or seven years of age, and the question of their schooling comes up. It would be well if we could reach that point where none of our children were kept out of school a day to hoe corn or pick cotton. Our school terms are all too short at best, and we cannot afford to shorten them; and right here it is absolutely essential that the poorest of us shall make whatever sacrifice is necessary to secure the best education possible for our children. This is more necessary for the poor than for the rich—the rich man may leave a fortune for his children to waste and degenerate upon, but the best (and almost the only) thing that the poor man can leave to his children is well trained minds and character, therefore train them well. Old men who have been all along the road of experience assure me that they have no regret for any sacrifice incurred if only their children turn out a credit to them. And by "education" I mean not only the learning from books at school, but also all other little lessons of manners, industry, honesty and unselfishness which can be taught them—either in school or at home.

It costs something to educate a family of children—I have reason to know that. It costs in time, money and sacrifice, all three, but it is a paying investment if the boys and girls are in frame of mind and heart to make use of their chances. If you wish to send your son through a four-year course at college and then send him for one or two years to a higher university to complete his special training in his chosen field of work, put it down that it will cost, if you pay cash for everything, in the neighborhood of \$1,000. But if that were all of the story I would not have told it. In almost every school and college there are boys and girls who are working their way through in whole or in part, as true heroes as died at Gettysburg or in the Wilderness. Every year we have boys doing this at the A. and M. College at Raleigh. I am assured that many girls do likewise at the State Normal at Greensboro. At Cornell University at Ithaca, N. Y., when I was a student there in 1899

and 1900, there were over 200 students working their way. Many institutions have special scholarships which may be secured by competitive examinations, and this gives a part of the expenses free. Some have a special "loan fund" from which money is loaned to worthy and needy students. Some provide work in the rooms, dining-halls or barns which can be done by the students as part payment of their expenses. We have had students come to the A. and M. College with \$15 or \$20 of borrowed money in their pockets, who went right into the barns to milk the cows, feed the pigs, clean the stables, and do all manner of menial service, and who went away at the end of four years, into profitable employment, with debts paid and diplomas in their trunks. Indeed, so many cases of this kind have come to my attention that I have come quite firmly to the conclusion that there are only four conditions necessary to fulfil in order that your child, boy or girl, may get a first-class college education: (1) You must be willing to spare them the time; (2) the child must have the determination to get the education in spite of disadvantages; (3) the child must have good health, and (4) must have good horse sense. Some manage it even without the health and good sense, but with these there is no longer excuse for ignorance.

Last summer in Iredell County a lady, whose son was in college said to me: "I wish you could talk to Mr. ———, he has a son who ought to go to college, but I guess it wouldn't do any good, they just haven't got the grit in the craw." My friend, that was a good expression—that "grit in the craw" is a very essential thing in securing an education, as well as in securing many of the other home improvements which I have mentioned. It takes the place of lots of cash, and as between the cash and the grit, the grit will usually accomplish as much if not more.

Let me suggest that you write to some of the best colleges you know of which give courses suited to the tastes of your children, and carefully look over their catalogues and inquire as to the aids which are offered to poor students who have not the money to meet all their expenses. There is not a college in this State that will not throw open its doors for a worthy determined farm boy or girl who comes with fixed principles and sincere purpose—and poverty is neither a disgrace nor an impassable barrier to such a person.

CONCLUSION.

I wish that you might hear some of the things that have been told me as I go about the State giving this talk at the institutes. The keen regret of those who have failed to make the home life what it should be, and the quiet inward satisfaction of those who have made the necessary sacrifice. At almost every institute I am told of actual cases which fully bear out the very arguments I have made. This information comes from men and women, young and old, and all goes to show that, after all, "be it ever so humble, there's no place like home," and that it pays to make the home-life as happy and bright as it can be made, to give to the wife and children every possible advantage of good house, good food, good surroundings, good literature and good schooling. It is like the bread cast upon the waters, for you find it again after many days, in the inward satisfaction that it brings to you, and the greater happiness and broader, better life for those around you.

ONE OF THE LECTURES DELIVERED AT THE WOMEN'S INSTITUTES.

HOME NURSING, By MRS. F. L. STEVENS.

Upon the efficiency of the nurse depends the comfort and welfare of our sick ones, in the home the physician is powerless unless there be an intelligent, skillful assistant in the sick-room to execute orders. In the country home, where the visits of the family physician must of necessity be at more or less irregular intervals, the nurse—and she is usually the mother or the sister—in the family must have knowledge to deal with cases of emergency as well as of prolonged illness. This talk, therefore, will be confined strictly to a discussion of the simple remedies and preventives that are easily obtainable in every country home.

The simplest home remedy, and the one most commonly resorted to for pains or aches, is the mustard-plaster, one part mustard to two parts flour, mixed with water and made into a smooth, soft paste, is recommended for common use. The proportion of mustard may be increased in case of severe pains. There are two facts that should be borne in mind about the mustard-plaster: (1) a mustard plaster should not be placed next to the skin—always place a thin cloth between the plaster and the skin; (2) the mustard-plaster should not blister. The blister is a disagreeable and slow-healing sore and is of no remedial value. It is better to use a smaller proportion of mustard and allow the plaster to remain a longer time.

The poultice is also a common and often misused home remedy, and material for poultices that may really cause harm, such as fat meat, milk and bread, etc., are often used. A poultice should be made of only material that can be thoroughly heated, in order to kill any organism that may be present, hence two materials are recommended—the flaxseed boiled with water into a soft paste and applied while hot, and common corn meal mush. These have practically the same efficiency, and should be applied in the same way.

The turpentine stoop for severe pain in the region of the abdomen, particularly when there are symptoms of appendicitis, is highly recommended. This stoop consists of one or two table spoonfuls of turpentine to one gallon of very hot water. Cloths wrung from this mixture and applied to the region of pain give quick relief, always being careful in changing the cloths—which should be done frequently—that the exposed surface of the body is carefully covered.

A word of information about germs in dealing with germ diseases is necessary. Germs, or bacteria, as they are more properly called, are very minute plants, so small that from one to two hundred can lie end to end and not exceed in length the thickness of an ordinary sheet of writing-paper. They reproduce, not as our flowering plants, but by division, that is to say, when one of these plants has reached mature size, it simply divides and makes two plants. It takes about twenty minutes for a germ to grow to full maturity and divide into two. When a germ which causes disease in the human body, and there are many that so do, is taken into the system, they very quickly multiply in great numbers.

Common boils are caused by these minute plant forms. These germs are present in the air, in garden soil, on garden utensils, and when the skin becomes injured in any way, these germs find their way into the wound and boils are the result. All wounds should be promptly bathed with something that will kill these organisms. For this purpose may be used a weak solution of carbolic acid, one part to thirty of water; bi-chloride of mercury, one part to one thousand of water; or creolin, one part to forty of water. Some material for cleansing wounds should be kept on hand for immediate use.

Lockjaw is produced by the presence of a germ that gains access to the body in the same manner as does the boil germ. This germ is also found in garden soil, on old iron, rusty nails, rakes, hoes and other garden utensils. The same treatment of fresh wounds as was suggested in the case of boils is recommended as a preventive for this dreaded disease. All bandages used

about wounds should be of freshly washed and ironed material, or of material that has been kept scrupulously clean. Old linen handkerchiefs and worn bed linen make excellent bandages, and should be kept for the purpose.

Diphtheria is a germ disease and very contagious. In this disease the germs grow and multiply in the throat, hence to avoid the spread of the disease all drinking utensils should be thoroughly scalded before being used by the other members of the family. In this connection a word about the water-bucket and dipper of our rural schools. No better work for public health can be done by the women of a school neighborhood than to banish the time-honored bucket and dipper and supply the school with a water-cooler which is operated by a faucet, and see that each child has his individual drinking cup. Many of the dangerous and troublesome diseases of childhood could be averted by this plan.

Typhoid fever is a disease affecting chiefly the intestinal tract, caused by the presence of a specific germ called *bacillus typhosus*. The germ is carried into the intestines with the food—usually drinking-water. Flies also are known to act as agents in the spread of the disease. The source of infection from a patient is through the excreta, which are loaded with living organisms ready to produce the disease in others, if by chance they gain entrance into the body. Hence all excreta from the sickroom should be treated with a substance to kill all the germs. Carbolic acid, bi-chloride of mercury, or creolin are recommended. All excreta should be buried with lime and not thrown on the ground or in the closet, and all vessels should be thoroughly cleansed with boiling water. The nurse should use exceeding care to cleanse the hands before taking food. Flies should be excluded from the sick-room. Hundreds of germs may be carried on their feet from the sick-room to the dining-room, there to infect the food that other members of the family are to eat. In cases of epidemics of typhoid all members of the infected neighborhood should *boil the drinking-water*.

In tuberculosis of the lungs we have a germ disease where the germ invades the lung tissue. Tuberculosis is easily transmitted, and extreme care should be exercised in nursing a tuberculous patient. The patient should not occupy a sleeping-room with other members of the family; all utensils used for food should be scalded after using; the patient's room should be free from hangings, pictures or carpets or any material that would serve to harbor germs. Small cups to receive the sputum from the lungs may be had, but a cheaper and quite as safe plan is to use a tin can or box containing ashes, or lime, which may be emptied and buried at frequent intervals. All cloths used by the patient about the mouth or nose should be promptly burned.

Malaria, another troublesome malady, is not produced by bacteria, but by a minute organism of the animal kingdom which invades the red corpuscles of the blood of the patient and produces chills and fever.

Malaria is transmitted by the bite of a mosquito. Not all mosquitoes carry the malarial organism, but in ridding our premises of the mosquito pest we may eradicate the malarial-bearing species. Mosquitoes lay their eggs in stagnant pools of water, rain-water barrels, or any vessel containing even a small amount of stagnant water. These eggs in a few days hatch into the wrigglers commonly seen in rain-water. After a few more days the wrigglers rise to the surface of the water, shed their skin and emerge full-grown mosquitoes. Mosquitoes do not fly great distances, so oftentimes attention to pools and utensils containing stagnant water in our neighbor's back yard may rid the neighborhood of this serious pest.

A word in closing about the alarming use of paregoric and soothing syrup by mothers of young children. These drugs do not relieve the difficulty which makes the baby fretful, they only dull the pain so that the child cannot feel. Constant use of these drugs cannot help but tell on the mental, physical and moral nature of the child.

What is true of paregoric and soothing syrups is also true of headache cures and other patented medicines used in such astounding quantities by the women of our country. The chief ingredient of these remedies is alcohol and other narcotics, and the stimulation felt upon taking them is only extremely temporary and leaves the body in a reduced state. So that only by a continued use and a constant increased dose is relief obtained. As women, it behooves us to wage war upon this habit.

FARMERS' STATE CONVENTION ADDRESSES.

On the following pages will be found a few of the addresses delivered at the Farmers' Convention, or Round-up Institute, held at Raleigh, August 28-30. It is regretted that many among the best addresses are unavoidably omitted from this publication:

PRESIDENT'S ADDRESS, FARMERS' STATE CONVENTION, 1907.

By ASHLEY HORNE, Clayton, N. C.

LADIES AND GENTLEMEN:—The State Department of Agriculture is the farmers' institution. It has provided the means for working up and advertising this Convention, and for bringing to it outside speakers. The work of this institution has grown manifold in volume and usefulness during the past few years.

That we may all be more familiar with its efforts in behalf of the agricultural, horticultural, live-stock, and other interests of the State, and be in a position to take advantage of what it is doing by calling on it for assistance when needed, and making suggestions of other things which it might do for our benefit, I direct your attention to a brief statement of its main lines of work, feeling that this will be interesting and useful to the members of the Convention.

Fertilizer Control.—It has become practically a uniform custom in all the States where commercial fertilizers are employed for the States to exercise a control over the trade. North Carolina was one of the first States to take up the inspection and analysis of fertilizers, to see that its farmers were not imposed upon, the fertilizer control in the State now being in its thirtieth year. Fraud was frequent in the early days of the control, as instanced by the selling of common salt for nitrate of soda and potash salts, together with other adulterants. This has now disappeared, and the fertilizers which the farmers purchase are, as a rule, what they are guaranteed to be, and our better manufacturers are anxious to have their goods comply with all requirements and to give the best possible results on the crops on which they are used. It is difficult to estimate the amount of saving to the farmers of the State which has resulted from the control of the fertilizer trade, amounting in round numbers to \$10,000,000 annually, by the Department. In addition to this, the advice which has been given farmers with reference to the use of fertilizers, has added largely to their saving in the cost of fertilizers, and to prospective crops. The analyses of fertilizers are published in the BULLETIN of the Department, so that the farmers can see just the character of goods which they have used; and, in addition, a large number of analyses are annually made for farmers of the State of mixed fertilizers or of formulas which they mix themselves.

FEEDING-STUFF INSPECTION.

Concentrated feeding-stuffs for our live-stock are as much subject to adulteration as commercial fertilizers. Before the passage of the feeding-stuff law in 1903 they were adulterated with materials having but little feeding value, such as chaff of the grains, oat hulls, peanut hulls, corn bran, screenings, corn-cobs, mill sweepings, cotton-seed hulls, etc. The extent to which our farmers and feeders were imposed upon prior to the operation of this law is shown by the fact that in one year over one hundred carloads of low-grade and worthless feeds were seized and condemned by the Department, among

these being a carload of wheat bran which had ground with it red corn cobs to the amount of 35 per cent of its weight, and several cars of mixed feeds containing rice chaff to the extent of 25 or more per cent of their weight. Large quantities of concentrated feeds are brought into the State, which, with those raised on the farm, amount in value to about ten million dollars. It means a great deal for the dairymen and feeders of all classes of stock to be able to get the very best material obtainable for their money for use as feeds.

INSPECTION OF HUMAN FOODS.

The Legislature of 1899 passed what is known as the Pure Food Law, and without any appropriation from the State made it the duty of the Department of Agriculture to enforce its provisions. Since the passage of the act seven reports have been issued, containing chemical and microscopic examinations of about 3,500 samples of foods and drinks, obtained in almost every town in the State, and including practically all of the foods and drinks offered for sale in the State.

The amount of adulteration at first was very large, amounting in the first year to 56 per cent of the materials examined. By publication of the results in the BULLETINS of the Department, in newspapers, and by correspondence with grocers, manufacturers and users, sentiment in favor of pure food has largely grown, and there has been a decided decrease in the amount of adulteration of practically all classes of foods—the per cent of adulteration in the last report (1906) being 25 per cent, or less than one-half what it was at first. These results have been accomplished largely by publicity. When certain articles or brands of foods were found to contain objectionable substances the facts were communicated to the grocer selling them, to the manufacturer putting them up, and the facts were published. By this means a great many manufacturers, most of our grocerymen, and many of our citizens are now familiar with the food law and its requirements, and much less adulterated food is now found on the markets of the State. This course, however, does not reach all violators, and in the future prosecutions will be brought for violations of the law. One of the most common sources of adulteration is the use of artificial preservatives. A special warning has been issued against the use of these, especially in meats, and a vigorous campaign pushed during the summer months in the examination of these products, along with soft drinks, many of which in the past have been artificially preserved.

MISCELLANEOUS ANALYSES.

In addition to fertilizers, concentrated stock feeds and human foods referred to in the previous sections, a very large number of other analyses are made for farmers and citizens of the State, including cotton-seed meal and other fertilizer materials, mineral waters, rocks, ores and minerals, marls, lime-stone, manure, soils, etc.

In two years 1902-1904, 4,811 such analyses were made, and in 1905-1906, 5,888, which is far in excess of the amount of work of this kind done by any other State, in our knowledge, for its citizens.

TEST FARMS.

The department is maintaining and operating four test or experiment farms, located in different parts of the State on large and different types of soils, for the purpose of obtaining reliable information of practicable value to farmers. The major part of the experiments with field crops on all the test farms is conducted according to one general plan, so that results may be comparable and furnish data as to fertilization, culture and methods of handling these crops on the different soils and in different sections of the State.

After these various tests have been repeated a sufficient number of times to assure accuracy, the results are given to the farmers of the State both by word of mouth and by publication in the monthly BULLETIN. Then other crops are taken up. To the present time most attention has been devoted to corn and cotton, the State's two leading staple crops; but considerable work has

been given to cow-peas, peanuts, bur clover, vetch, grasses, small grains, etc. The extent of the work with field crops is shown by the fact that on the Edgecombe and Iredell farms combined were conducted during 1906 between 250 and 300 tests with corn, about 250 with cotton, 130 with cow-peas, 36 with peanuts, 50 with alfalfa, 23 with wheat, 5 with oats, and a large number with grasses and bur clover and hairy vetch.

The fertilizer experiments, which are the most extensively conducted of any of the tests during the six years in which they have been in progress, have shown that the fertilizer requirements for the different types of soil are quite variable. This is especially marked by the increase in crops on the sandy soils of the east from the use of potash and the absence of such increase from its use on the red clay soils of the Piedmont section. Large savings in the fertilizer bill of the State can and is being made by the use of this information by the farmers of the State.

A large number of tests, looking towards the improvement in the yield of cotton and corn by seed selection, have been conducted during the past three years with promising results. Experiments are also in progress on the Pender farm to obtain information concerning the best fertilization, varieties, cultural treatment, etc., for the various truck crops grown in that section of the State. The Transylvania farm, located between Brevard and Hendersonville, is largely devoted to conducting experiments with apples, Irish potatoes, corn and the grasses.

SOIL WORK AND SOIL SURVEY MAPS.

During the past three years soil surveys have been completed and maps published, showing the location and extent of different types of soil in Duplin, New Hanover, Chowan, Pasquotank, Perquimans, Transylvania, Henderson and Edgecombe Counties, and the beginning made on a map of Robeson County. These maps have been made in co-operation with the Bureau of Soils of the United States Department of Agriculture. About 22 per cent of the total area of the State has been mapped. Many samples of the type soils have been analyzed in the laboratory to determine the amount of the different plant food constituents in the soils of the different sections. These analyses have revealed marked differences in the amount of plant food contained, and with the experiments on the test farms have thrown much light on the fertilizer requirements and cultural methods needed for the best results.

THE HORTICULTURAL WORK.

The horticultural possibilities of North Carolina are not surpassed by those of any other State in the Union, and certainly they are not equaled by those of any other State in the South. Every peculiarity of soil and climate, every possible condition of plant environment found on the Atlantic seaboard, from Florida to New York, can be found duplicated in this State. The movement which will result in their full development is well under way, and in this work the State Department of Agriculture is materially assisting through the Division of Horticulture. Trucking crops of the east are being studied on the Pender farm, where experiments are conducted with lettuce, strawberries, potatoes, cabbage and other truck crops, pecans, and, on a small scale, other tree fruits. An extensive planting of scuppernon grapes is being made, which will include all known varieties with tests of methods for cultivating, fertilizing, pruning, training and handling the products. On the Iredell farm tests are being made of pecans, peaches, pears and in a small way apples and small fruits. On the Transylvania farm varieties of apples possibly suited to the section, are being tested and plans are being made for experiments with peaches, celery, cabbage, potatoes, etc.

ENTOMOLOGICAL WORK.

Although the Division of Entomology has been in existence but a few years, there is a constant and increasing influx of enquiries regarding insect pests of particular crops and plants, together with appeals for effective methods to control the evil-doers. These inquiries receive the prompt attention of the

Entomologist, who, in cases of severe insect outbreaks, makes personal visits where possible for the purpose of investigating the trouble and advising as to its control.

As new insect pests are constantly appearing and many of the old ones have not yet been effectually controlled, experimentation necessarily forms an important part of the work of the Division. These experiments consist of the devising of some control scheme and the placing of it in actual practice in the field. The past winter successful experiments were made against the pernicious San Jose Scale, while now the Division is engaged in an elaborate experiment to control the detestable little white worm common in peaches (*peach curculio*). A successful subjugation of this latter insect would mean thousands of dollars saved to the peach growers of this State.

Situated in the different parts of North Carolina are about sixty nurseries, whose stock is sold all over the State. Each year the Entomologist makes a careful inspection of the salable stock of these nurseries to learn if any of the more harmful insect pests are present. All infested stock is destroyed. The advisability of this proceeding can readily be understood when one considers that a noxious insect, harbored in a large nursery in the State might, in a single season, be scattered all over the State were no means taken to prevent it.

The Division aims to aid and protect the orchard interests, especially the extensive peach interest in Moore and Montgomery Counties, and the apple interest in the western part of the State. It is now gathering information relative to bee-keeping and the production of honey, which is an important item with many persons in the eastern counties.

ANIMAL HUSBANDRY.

The work in animal husbandry was formerly confined almost exclusively to the answering of correspondence and the giving out of general information relating to the breeding, care and feeding of live-stock, but since the establishment of the test farms information of more definite character is being supplied. Moreover, these farms are being stocked with pure-bred horses, cattle, sheep and hogs, which, while furnishing material for experimental work, are also being supplied to the farmers of the State to improve the native stock.

In addition, beef-cattle are being fed on these farms, in car-load lots, for the purpose of obtaining definite information on the subject that will certainly apply to North Carolina conditions. This work has already progressed sufficiently to demonstrate that by using what are usually waste products on the average farm, the feeding of beef-cattle can be made profitable.

FEDERAL CATTLE QUARANTINE RESTRICTIONS.

When the Federal Government placed a rigid quarantine on all of the cattle in the State, because certain parts of it were infested with cattle ticks, it became necessary for the State Department of Agriculture to establish and maintain a line separating the cattle of the infected section from those of the tick-free section. The State Department established this line and maintained it to the satisfaction of the Federal authorities, and as a result of this the cattle from our best cattle-growing sections were permitted to be shipped to any part of the country; whereas, had this line not been maintained by the State, the cattle of the entire State could not have been shipped except for immediate slaughter.

Such quarantine restrictions placed on any section mean a depreciation in the price of cattle from one-fourth to one-half cent per pound. At one-fourth cent per pound the benefit to the sixteen mountain counties alone, of an unrestricted market, is fully \$100,000 a year.

CATTLE TICK EXTERMINATION.

Realizing the benefits resulting in freedom from the presence of the cattle tick, the Department of Agriculture began a campaign of tick extermination, which, after seven years' work, has resulted in freeing twenty additional counties from ticks and obtaining their release from quarantine restrictions.

The loss occasioned by the presence of cattle ticks in these twenty counties was certainly not less than \$60,000 annually, which is fully twice what it has cost to clean them of ticks. Moreover, the successful work of the North Carolina Department of Agriculture in eradicating ticks from infected territory, first demonstrated to the world the feasibility of eradicating the cattle tick from large areas, and this has been chiefly responsible for the fact that the Federal Government is this year expending \$150,000 in this work, a good share of which is coming to North Carolina.

CONTROL OF ANIMAL DISEASES.

The Department endeavors to investigate all outbreaks of disease when there is reasonable ground to suspect that it is of a contagious or infectious nature, or when there is a sufficiently large number of animals affected to make the outbreaks of general interest to a community, but no calls are made by the Veterinarian for private cases or individuals at the expense of the State. To illustrate the practical utility of this line of work it may be stated that during the past five years several outbreaks of the disease known as glanders have occurred among horses and mules, and have been effectually controlled by the Department Veterinarian without serious loss or spread of the disease.

FARMERS' INSTITUTES.

The Department of Agriculture is, by law, given charge of farmers' institute work in this State.

In 1898 there were held only twenty-eight institutes, whereas, during the past year there have been held 169 institutes for the men and women on the farms and the attendance has been about three times what it was six or seven years ago.

The institute is intended as a purely educational institution for the men and women on the farms who have passed the age when it is practicable for them to attend school or college. Nothing but strictly agricultural subjects are discussed at these meetings, and as far as possible the discussion will be directed along those lines which tend to increase knowledge in the production of our crops and thereby lessen their cost.

While this State is probably doing more institute work than any other Southern State, it also has the distinction of being the first to inaugurate institutes for the women from the farm homes, which is destined to accomplish so much for the improvement of rural conditions. It is the purpose of these women's institutes to show how improvements may be made and are within reach, with the facilities already existing, or easily obtainable.

Fifty of these women's institutes have been held during the past year, and the demand for them is already far beyond the facilities for holding them.

IMMIGRATION.

From its inception the Department of Agriculture has had to do with immigration, because the Constitution of the State designates it the "Department of Agriculture, Immigration and Statistics." From time to time the question has engaged the attention of the Board. The fact that the people of the State have not approved of what is generally covered by the term "indiscriminate immigration" has controlled the efforts of the workers in the Department, limiting them to inviting only home-seekers and persons of sufficient means to enable them to become investors in one way or another.

But there is to-day, as never before, a demand for honest, industrious, law-abiding settlers and laborers to come. Our farmers complain that labor at any reasonable price cannot be had; that if more wage is to be paid, it must be met with more efficiency, more intelligence and more loyalty than has characterized the labor of the past. They want labor that will work six days in the week and that will give reasonable attention to all kinds of farm stock and tools and work with a view of securing the best results. The Department has begun the work of supplying the class of people needed. It is slow. It must be, in order to make proper selection. Our people have voiced a preference for English speaking people, those from the northern and western

portions of this country, Canadians, English, Scotch and Irish, and next to these the sturdy German stock.

It is the home seeker, the investor, no matter how small, that the Board is seeking to attract to the state. This has been its work and is responsible for the many exhibitions of resources made in the past and for the illustrated literature it annually sends out to thousands who enquire for information and enlightenment as to the opportunities of the Old North State. Every available channel for advertising the State is taken advantage of, and it is expected that this systematic work will bring to us the people who want homes.

The last session of our Legislature appropriated \$5,000.00 for this work and required the Board of Agriculture to use a like sum annually for the purpose of securing desirable immigration.

THE BULLETIN.

This monthly publication is the mouth piece of the Department, carrying to the homes of our farmers, truckers, dairy and cattle men, the results of the experimental work done in all departments under the direction of the Board. It also gives exact information to all purchasers of commercial fertilizers of both the money and the plant food value of every brand of fertilizers sold or offered for sale in the State.

The Department is doing ten times as much work now as it did twenty years ago, and the Bulletin has ten times the circulation it had at that time. Its purpose is to give to the reader the best advice obtainable, based upon scientific knowledge and research and experimentally proved at the Board's Test Farms. It is in no sense an "Agricultural Journal," nor is it intended to take the place of one. 35,000 copies are issued monthly giving the best information obtainable to the farmers of the State free of cost to them individually.

THE MUSEUM.

The one aim of the museum is to place before the visitor in an attractive and convincing way such interesting and valuable facts regarding the natural resources and natural history of the State as may be taught by means of a display of well labelled specimens, and a fact taught in this way is much more convincing and its effects much more lasting than one learned from a book or lecture. This idea is always kept in view in the conduct of the museum.

This is one state institution of which all the people seem proud. Go where you will, from the mountains to the sea, in nearly every community will be found people who have visited the museum and brought away facts and impressions that will stay with them as long as they live.

The teachers in the schools and colleges of the city recognize the museum's value educationally. Many classes are conducted through it for special lines of study and individual school children are frequent and constant patrons. Among excursions, State Fair visitors and crowds here for other special occasions are always some groups from schools and colleges all over the State, and the museum is not the least of Raleigh's attractions as an educational center. The museum invites correspondence and the submittal of specimens for identification from every section of the State. The museum of the State Board of Agriculture is generally conceded to be the best museum of resources and natural history in America devoted to one State's products.

NEW YORK.

The Board of Agriculture and the workers of the Department are constantly on the outlook for things which can be done to better the farming industry. The four test farms, which are now in operation, have created a demand in other sections for this class of work; and the Board of Agriculture, at its last meeting, passed a resolution expressing its purpose to establish, as soon as its means would permit, a farm in the northeastern section of the State to conduct experiments with peanuts and the general farm and trucking crops in that section; one in the Old Bright Tobacco Belt to make tests of tobacco and other crops now grown or which may be profitably grown in that section; and one in the northwestern end of the State to study the grasses, grains, live stock and other farm problems of interest there.

Seeing the need of reaching in a more personal way farmers, on their own farms, than is done in the test farm or Farmers Institute work, and carrying better methods to the farms, the Board authorized the employment of a special worker to conduct co-operative experiments. The services of Mr. T. B. Parker have been secured for this, and the work will include experiments with the various farm, truck and fruit crops, the testing of varieties, of fertilizers, culture methods, etc.

METHODS OF SEED SAVING AND SELECTION AS FACTORS IN THE IMPROVEMENT OF TOBACCO.

By E. H. MATHEWSON, U. S. Department of Agriculture.

It is apparent to all thoughtful people that we are living in an age of rapidly changing economic conditions. So rapidly is the advancement of science, invention and mechanics that the methods and processes of one decade are almost sure to be obsolete in the next. More advancement has been made during the last century in the development of scientific and mechanical industries than in, perhaps, the whole prior history of the world put together. At no time, in this wonderful century of progress, has development gone on at a greater rate than it is to-day.

It is not in the mechanical industries alone that marked progress is being made. Agriculture herself, ponderous and slow-moving though she must of necessity be, is moving forward at a faster rate than ever before. Science is not working alone for the furtherance of the mechanic arts and manufacturers. Our own great nation, for the advancement of its enormous agricultural interests, employs several thousand scientists, specialists and other workers, all laboring for the advancement of agriculture, and at an expense now amounting to some seven millions of dollars annually. Each of the individual States likewise, working in a measure independently, is also making great efforts and large expenditures for this same purpose.

The amount of systematic knowledge, already very large in its extent, is piling up for the benefit of the farmers of this country at an almost incredible rate. The greatest problem of all in connection with this work is how to get this mass of information into the farmers' hands, and get them to profit by it.

That is why I am here to-day. The great National Department of Agriculture, laboring and eager as it is to help farmers everywhere, sends me here for the purpose of putting before you tobacco-growers in a specific way some of the information which has been accumulated, at no little expense, for the improvement and increased profit of your industry.

We have something for you to-day which, in all modesty, we think is well worth your attention, and will be the means of adding to the profits from your tobacco-growing, with but little, if any, additional expense. I refer to the possibilities of increasing the yield and quality of the product by means of more systematic and more scientific methods of seed-saving. Enough careful experimental work in this line has already been done—notably by Mr. Shamel, in Connecticut—to show conclusively that very much more than you might expect can be done for the enhancement of your profits by more intelligent attention to so simple and inexpensive a matter as the selecting and saving of seed.

LIGHT VS. HEAVY SEED.

Take, for example, so small a matter as the lightness or heaviness of the seeds which you sow. Tobacco seeds are very small, and the amount of plant-food materials stored therein for the use of the young plantlets is at best very little in amount. The heaviest seeds, with their greater food supply, will give the young plants a much better and a more uniform start than will the light seeds, and they will be ready to set some days earlier. Careful

experiments with tobacco seedlings has proven this to be so in fact, and it is not mere theory.

A simple and satisfactory apparatus has been devised for separating the light from the heavy seed in a rapid and inexpensive manner, and has been placed on the market by Queen & Co., of Philadelphia. It consists of an ordinary chemical foot-bellows and a glass tube about five feet long. A wire screen of very fine mesh is inserted near the bottom of the glass tube, and about an ounce of seed at a time is placed thereon. A blast of air of appropriate strength is then forced up through the tube, the lighter seeds being blown out at the top.

IMMATURE SEEDS.

It is important, also, not to sow any very immature or undeveloped seeds. They will give a weak plant, that will tend to blossom out prematurely before the plant has set a sufficient number of leaves to give a satisfactory yield. By the simple expedient of picking off and discarding all undeveloped seed-pods at the time when the seed-heads are harvested the danger from immature seeds will be obviated. It ought always to be done.

SAVING SEED UNDER BAG.

The development of seeds is dependent upon the union of the male and female element of the flower. In some plants—as wheat, for example—this normally takes place within the same flower, with no crossing whatever from one flower to another, either on the same or different plants. In others the fertilization is always from one flower to another, either upon the same or different plants. There are yet other classes of plants in which either self-fertilization or cross-fertilization may readily take place, although there will usually be a tendency in favor of one way or the other, according to which seems to be most natural and for the best interests of the plant.

Tobacco comes under this third category, and, while the flowers are abundantly self-fertile—are, indeed, as a matter of observation, most frequently self-fertile—they may, however, be readily cross-fertilized by artificial or natural interference, and under ordinary conditions there is considerable of this cross-fertilization accomplished. The tobacco flower at maturity secretes at the bottom of its flower tube a sweetish substance. Bees or other insects pass in and out to secure this secretion, and, in doing so, rub against the anthers and get some of the pollen grains on their bodies. In passing into another flower this pollen may be rubbed from their bodies onto the ripe and sticky stigma, and cross-fertilization takes place. It has been verified by experience that self-fertilized tobacco seed, being, as it seems, the most natural way for the fertilization of its flowers to take place, possesses as great, if not greater, vigor than does cross-fertilized seed.

Much of the tendency for plants to deteriorate or “run out,” as it is called, is, no doubt, due to undesirable cross-fertilization. Although seed may be saved from a plant of good quality, it should be taken into account that it is only the mother plant, and that the male parent may have been a plant of much inferior quality. The uncertain quality of the seed produced from such a union is very obvious. Taking advantage, however, of the naturally self-fertile character of a tobacco flower, the tendency to run out from this cause may be entirely done away with.

By placing an ordinary twelve-pound manila-paper bag over the flower head just before the flowers begin to open all danger of injurious cross-pollination will be prevented. All the lateral flower shoots should be removed before bagging, leaving only the central cluster; and if any flowers should have chanced to open already, they should likewise be removed before the bag is applied. It will be necessary to raise the bag up the stalk every few days at first, while the head is growing rapidly, in order to give it room.

HOME-GROWN SEED IS BEST.

Tobacco, in common with nearly all plants, possesses the latent faculty, within certain rather wide limits, of modifying and adapting itself to the circumstances of soil, climate, etc., in which it finds itself. If a strain of

tobacco has been grown persistently in one section and under a certain set of environments for a long period of time, it has tended to adapt itself to those conditions, and becomes better suited in constitution and character to that section.

Other things being equal, therefore, a strain of seeds that has been developed in any section ought to be better for that section than seeds brought in from some distant place, where the enviroing conditions are materially different. If a strain seems to run out after being in a certain section for a long period of years, it is quite likely to be due to lack of intelligent and careful methods of seed selection and saving, rather than to any inherent inferiority in the strain itself.

The principles thus far mentioned are very simple and such as any farmer can easily carry out, with but little expense and loss of time. To sum them up briefly, they are: Use only heavy, mature seed; save it under bag to prevent running out by cross-fertilization with inferior plants; and, as a general rule, stick to varieties developed in your own neighborhood, rather than those from distant communities, where conditions are somewhat different. These methods will undoubtedly maintain in full the superior points of any strain of seed, and there will be in most cases an improvement even, if sufficient care is taken to save seeds always from the most superior plants that are produced.

METHODS OF IMPROVING THE TYPE.

It is to be expected, perhaps, that the main steps forward in improving plants can best be taken by trained specialists, who are in a position to make a careful study of the subject over a very wide field, and who can devote their time to it persistently and in a systematic manner for the necessary period of several years.

In working for the improvement of crops by breeding methods, the prospects for ultimate success are based upon the recognition of the principle of individuality and of variability among plants. It is the key to the situation, and in it is found the breeder's opportunity. Is it not a most reasonable proposition to suppose that each plant has its own individual peculiarities, independent of the circumstances in which it is placed, in very much the same way that animals have their individual peculiarities? One plant may naturally have a stronger digestive or assimilative power than its neighbor, and will, therefore, under exactly the same conditions of soil fertility, climate, etc., make a larger growth. Another plant might differ in the number of leaves it would naturally bear; yet another would differ, perhaps, in the shape, size, venation, thickness or other quality of the individual leaves; another in the distance from one leaf to the next on the stalk; that is, in the length of the internodes, again there may be an occasional plant here and there that, by reason of some constitutional vigor or structural modification, may offer a much greater resistance to the attacks of rust, blight, wilts, or other diseases than its neighbor, and would thus offer an opportunity of breeding up from it, by inheritance and selection, a race of plants that would be proof against one or more of these diseases. Either of these individual plants may also differ markedly in its power to transmit and perpetuate its own peculiarities. This last is a very important fact to be taken into consideration by those engaged in the systematic improvement of the species. It is here that we see the origin of the idea of "blood lines," of such generally recognized importance in animal breeding—prepotency, as the animal-breeders call it. Any of these individual peculiarities may be seized upon by the plant-breeder as a starting point for the improvement of the type.

IMPROVEMENT BY BREEDING.

There are, broadly speaking, two general methods of procedure in improving plants—the method of hybridization, or cross-breeding, and the method of straight selection.

By the method of hybridization the flower of the mother plant—that is, of the plant selected to produce the seed—is artificially impregnated with pollen from the plant selected as the male parent, all other pollen being carefully excluded. To prevent self-pollination, the flower is emasculated:

that is, the stamens are removed just before maturity, and a small paper sack is placed over each emasculated flower to prevent undesired accidental cross-pollination. When the stigma is in a mature and receptive condition, pollen from the male parent is applied by rubbing the ripe anther on the sticky stigma. The aim in this method is to so combine certain of the qualities of each parent as to secure an offspring of better quality as a whole than is possessed by any plants already in existence. In all probability there will be a variety of forms resulting from a cross of this kind; and then, by careful selection from among the variants, followed again, perhaps, by renewed crossing and selection, the results hoped for and planned on will be, perhaps, at last obtained. There is a most inviting field here for the experienced breeder; but, as a general proposition, more prompt and satisfactory results may be looked for from the method of pure selection.

IMPROVEMENT BY SELECTION.

The ultimate hope for success by this method is based upon the certainty of finding differences among individual plants. Some are surely more efficient than others in making money for the farmer. In some cases plants of such very marked superiority are occasionally to be found as to stand out as distinctly new varieties. Mr. Shamel, in his work in Connecticut, after close observation throughout a forty acre field containing upwards of 500,000 plants of Sumatra tobacco, found 28 plants of such marked superiority over any of the other plants of the field as to really constitute a new variety of unusual merit. After only three years' work, with these twenty-eight plants as a basis, he has succeeded in working out and establishing a variety of wrapper tobacco of Sumatra type which has great yielding power, together with remarkable uniformity and very superior commercial qualities.

In making observations through a large number of tobacco fields in Maryland, Mr. Coley found a single plant differing remarkably, without apparent cause, in the vigor of its growth and the number of leaves it bore. Instead of the usual twenty-five or thirty leaves borne by all the other normally good plants, this specimen had one hundred and four leaves, of broad, dark green, vigorous growth. The leaves were placed extremely close together on the stalk, so that this plant, with its hundred leaves, was but little taller than the ordinary plants, with twenty-five or thirty leaves. The seed of this plant was saved and when planted, the succeeding year, it was found that every plant of it followed after the general peculiarities of the parent plant.

Work is being done in Maryland on that strain now; but it is as yet too soon to say what its ultimate commercial value will be. It will certainly be a great yielder in pounds, and, so far as appearances go, the type of the leaf seems to be good.

I mention these cases to show the great possibilities occasionally lurking around, but usually lost for the sake of someone to recognize their value for breeding purposes. Similarly, no doubt, you growers of bright tobacco have every year scattered through your fields an occasional plant of unusual superiority, differing, perhaps, in its vigor of growth, or in its tendency to ripen or yellow more uniformly, or a natural toughness and thickness of leaf, or in having finer texture and fibers, or perhaps in some other desirable quality. Even if such plants are recognized and saved for seed, their superior points are pretty certainly impaired or soon lost altogether by cross-fertilization with inferior plants. Saving the seed under bag would have saved them entirely free from danger of deterioration in this way, and then, if followed up by repeated careful selection of the progeny, perhaps a new variety of greatly increased profitableness might have resulted.

Suppose now an experienced breeder were to enter a section with the aim of improving by selective methods the strain or type of tobacco being grown there. His procedure would be somewhat as follows: All through the growing season he would pass up and down through many tobacco-fields, closely scrutinizing and measuring each plant with his experienced eye, for the purpose of finding some plant of unusual quality or vigor. He is sure to find one here and there amongst many thousands, perhaps. He tags it, gives it a number, and enters a few notes in his field book describing the important points

of the plant. And so the systematic breeder goes on, selecting here and there a promising specimen, making in the aggregate a very large number of selections—hundreds, perhaps—well knowing that his ultimate chances for success are greatly increased by so doing. He saves seed from each of these plants under bag, to prevent any crossing from one to the other or with less desirable plants. The next spring, he will plant the seed from each plant separately in the seed bed, and when large enough will set, perhaps, a single row of each sort of about one hundred plants each, side by side on a well-prepared, uniform piece of land.

After careful observation of these progeny rows in the test plots during the growing season, it will probably be found that some of the parent plants were superior to others in their power to transmit to their offspring their own desirable qualities. A few of the more promising progeny rows will be chosen in turn for testing again, and for this purpose a few of the best plants in the chosen rows will be selected for seed, and the remainder topped and handled in the same manner as in an ordinary commercial field. Notes will again be taken of the plants as they appear in the field, and also in regard to the yield, quality and other commercial points of the cured product.

This process of culling and selection should be kept up for three or more generations, in order to establish "blood lines" of a prepotent and substantial character.

In breeding it is usually best to center the attention on one primary object at a time, paying only enough attention to other points of quality, etc., not to let them fall below par. After improvement in this central motive has become established, then the attention may be successively turned to improvements in other directions.

PREPARATION OF PLANT BEDS AND FERTILIZATION OF TOBACCO.

By W. A. PETREE, Stokes County.

According to the program, I suppose that I am expected to discuss the preparation of plant beds and fertilization of tobacco. There are various ways to do these things, and before we decide to do them in any certain way we should consider the cost involved and also the benefits to be derived from doing them in that particular way. Up in our country, until within the last two or three years, the most common and by far the most expensive way of preparing a seed-bed was that in which burning of the land was a part of the preparation. But I do not favor this method, and shall say but little about it other than to discourage its use, especially in sections where wood is scarce, for burning does not add any fertility to the land, only the ashes of wood consumed, and the plant food in the ashes can be supplied more cheaply in some other way. Burning involves too much cost, not only in the way of wood, time and labor, but the humus or organic matter is burned out of the soil, its nitrogen driven off and the land is left poorer than it was before and requires more manure and fertilizer to make a good crop of plants than it would had it not been burned. It is true, however, that burning does destroy the weed and grass seed in the land, but this can be done more cheaply in another way, of which I shall now tell you. And, by the way, it is a way by which I have always been able to get a fine crop of turnips while preparing the land for my plant beds.

Just as soon as I can after wheat harvest, I go into my stubble field and select a place on some good warm southern or southeastern slope of land, neither too wet nor too dry for tobacco plants. I spread manure over it and turn it under and then let it lie a few days until the weed and grass seed in the land and manure sprout and begin to come up; then I take a long bull-tongue plow and plow the land good and deep twice, crossing the first plowing with the second one. I let it lie a few days longer, or until more weed and

grass seed sprout and begin to come up, then I cultivate the surface of the land and kill the weeds and grass again.

I keep up this surface culture after every rain to sprout and destroy the weed and grass seed in the land and conserve the moisture. When the time comes to sow turnip seed I look out for a rain; when I see a cloud coming, and am reasonably sure there will be rain, I mix my turnip seed with a liberal quantity of some good fertilizer rich in potash and sow them down on the prepared land and rake them in lightly. When the rain comes the seed sprout and the young plants come right on up and get rooted in the land before it dries out. But just before the seed comes up I always give the land a good coat of tobacco stalks, reserved for that purpose. Following this method, not one year in the last 16 or 18 have I failed to get an unusually large yield of the very finest turnips; but this is not the good part of it, having sprouted and destroyed the weed and grass seed in the land while getting ready for the turnips, doing just a little more work puts it in fine condition for tobacco plants. When the time comes to sow the tobacco seed, all you have to do is to pull the turnips off, if they have not yet been taken off, rake off the old tobacco stalks, if they are not rotten enough to work into the land, put on a little more manure free from grass seed, and sow down over the bed a liberal quantity of some good fertilizer and work it all well into the land, making a fine mellow seed-bed. Smooth it off well; then measure out the tobacco seed you wish to put on the land and mix them with a sufficient quantity of dry ashes, sand or fertilizer to handle well and sow down on the bed, putting on about half the seed while sowing from end to end or in going over the bed the first time. Then turn and go across the other way or sow from side to side the other half of the seed. This going over the bed twice insures an even distribution of the seed on the land. After the seed are sown, rake or brush them in lightly, firm the soil in some way, put on the canvas and your bed is done, and all without burning a stick of wood. Now, I have told you of what I believe to be the best way to prepare a plant bed and also of what I believe to be the most expensive way (that of burning). Of course, there are other ways. One way is to go into the forest and select some good, rich, moist spot of land in a warm place, rake the leaves off, dig up, manure and fertilize well, and sow the seed without burning the land. This is a very good way, and I have no objection to it, only that plants grown in this way are usually more tender than plants grown in beds out in the open field. When beds are prepared in this way we should always be careful to dig down well around the edges of the beds and cut off all the roots that may have grown out into the land from surrounding timber. Otherwise these roots will rob the young tobacco plants of all the food and moisture they should have, and they will be a failure.

Another way of preparing seed-beds is that of keeping over old beds from one year to another and sowing them without reburning. In this case, when the plants are pulled off a bed it is then covered over with straw or leaves sufficiently thick to keep the weeds and grass from growing up over it and sown again the next year. But I do not like this method, as such beds are likely to be damaged more or less by grubs. Then, too, the plants on such beds are liable to be attacked by root-rot and other diseases. In case beds are kept over in this way they should always be sterilized before the tobacco seed are sown. To sterilize a bed it is advisable to add one pint of formalin to every 12½ gallons of water used, and spray the mixture uniformly over the bed, at the rate of from three quarts to one gallon to every square foot of land; then put on the canvas and let it stay on one or two days to keep in the fumes; then take off the canvas and let the bed air and dry some ten days or two weeks before the tobacco seed are sown. Some claim that one and one-half or two pints of formalin to every fifty gallons of water is strong enough for this sterilizing mixture.

Now, I have said all I wish to about the preparation of plant beds. Of course, there are some little details about the work I have failed to mention, but they are of minor importance, and I take it for granted that the intelligent farmer will understand just where they come in and know how to deal with them in his practice.

THE FERTILIZATION OF TOBACCO.

As to the fertilization of tobacco, I will just say that, as there are so many different kinds of soil and different types of tobacco being grown upon them, I cannot give any definite rules as to what kind of fertilizer should be used or how it should be applied; for what would be good for one farmer's soil and tobacco might not do so well for another man's farm and type of tobacco. So I will just say that the kind of fertilizer, or rather the per cent of the different plant-food elements in the fertilizer, and the sources from which these elements are derived are to be determined in great measure by the type or kind of tobacco you wish to grow, and by the kind of soil it is to be grown upon. Also, we should take into consideration the kind of crop which immediately precedes the tobacco crop. If the tobacco crop follows a crop which feeds or draws very heavily on any one or more of the plant-food elements in the soil, then it should have heavier applications of these particular elements than if it follows a crop which takes less of these elements out of the land. On the other hand, in the case of leguminous crops, the greater the quantity of nitrogen they add to the soil the lower may be the per cent of nitrogen in the fertilizer intended for the tobacco which follows them. Sandy soils need more potash for tobacco than clay soils. The thick, dark, heavy types of tobacco need more nitrogen, especially organic nitrogen, than is required for the bright or lighter types. For the bright types grown up in our country, I get good results by using a mixture composed of acid phosphate, pure dried blood, nitrate of soda and high-grade sulphate of potash, mixed in such proportions as to analyze about seven per cent phosphoric acid, five per cent nitrogen and eleven per cent potash. This is a good mixture for tobacco, as the nitrate of soda gives the young plants a quick start, while the nitrogen in the blood is being made ready for their use later on. In all mixtures for tobacco I think it is best to supply the nitrogen in at least two different forms, in the form of a nitrate, as nitrate of soda or nitrate of potash, and also in some one of the organic or slower-acting forms, as dried blood, cotton-seed meal, or something of the kind. As the young tobacco plants need to be started off to growing early and rapidly, and as they extend their growth over a considerable length of time, the organic or slow-acting forms of nitrogen would not start them quickly enough; while, on the other hand, the nitrates would give them a quick start, but would be likely to leach or wash out of the land to some extent before the tobacco is properly matured. For these reasons it is best to combine the two forms of nitrogen in all our mixtures for tobacco; though, if we could get the time to make several small applications of nitrogen to our tobacco while it is growing, possibly we might get fairly good results by using the nitrate without any of the slower-acting forms. But I think it is better to combine the two forms, as by so doing the crop is more sure to be properly nourished until it is matured. Then, too, by using the organic forms of nitrogen we put some little amount of humus into the soil; and you know something of the importance of humus. It enables the land to hold more water, and thus keeps all the plant-food elements in a more soluble condition, so the plants can take them up. So we see that the filling of the soil with humus is really a part of the proper fertilization of our tobacco; for fertilizers, and especially mineral fertilizers, do not give their best results without it. Then let me urge you tobacco farmers to go to work and get your tobacco lands filled with humus as soon as you can. In my experience and practice, I have learned of no quicker and easier way to fill the land with humus-forming matter than by sowing cow-peas and rye and working the dead pea-vines and rye into the land. If you will do this, you will not only be fertilizing your land and crops by bringing the plant food already in the soil into more available forms, but you will be giving them additional supplies of nitrogen from the air much more cheaply than you can buy it from fertilizer dealers.

In making mixtures for my tobacco, I supply the potash by using high-grade sulphate of potash, or else nitrate of potash; for the quick-acting forms of nitrogen, I use either nitrate of soda or potassium nitrate; for the organic or slow-acting forms of nitrogen I think pure dried blood and cotton-seed meal are as good as any.

MODE OF APPLICATION.

As to how to apply the fertilizer to the tobacco, every farmer will have his own way. I like to apply it in such a way as to always keep it moist, and in such quantities as will give the tobacco a quick and rapid growth and push it on to maturity. I apply the fertilizer in the drill or row. When the land is properly prepared, I lay off the rows with a shovel plow of medium width, going twice in the same furrow or row, to insure uniformity of depth and width of furrow, being careful, if the land is open or leachy, not to run the furrows too deep. After the fertilizer is strewn in the rows, another hand follows with another shovel plow, a little wider than the one with which the rows or furrows were opened, and covers it by running a furrow on just one side of the row or furrow containing the fertilizer. This leaves one side of the rows still connected with the middles, or land between the rows, and allows the moisture or water in these middles to feed out to the fertilizer and hold it in a more soluble state than is the case where it is covered by running a furrow on both sides of the row; for in this case the rows are broken or cut loose from the middles, or land between them, and the water in the middles cannot pass out to them so readily. And these ridges or rows being exposed on both sides to the drying influence of the air and sun soon dry out, and tobacco set on them does not grow off so rapidly as when set in rows prepared the other way. When the fertilizer is covered by running a furrow on just one side of the row, the tobacco plants are to be set over the fertilizer, or just in the edge of the furrow, and a little below the general level of the land, and then have flat culture. This method of fertilization and culture is preferable on well-drained and dry-matured lands and in dry seasons. On the other hand, if we have to contend with wet lands and wet seasons, it is best to plant our tobacco on ridged rows and keep it on them; for if the land contains an excess of water the tobacco roots drown and cease to perform their functions, and perhaps take up much less water and plant-food from the soil than they would if planted in drier land. In my judgment, tobacco planted on such land will wilt, fire and suffer a great deal more for lack of water and plant food than tobacco planted on our ordinary dry lands and in dry seasons. So each farmer should exercise his own judgment as to whether he should plant his tobacco on ridges or give it flat culture.

When tobacco is planted on land that is naturally very rich, if we want to keep it from growing too rough and coarse, I think it should be fertilized very liberally with a quick-acting fertilizer; for, if it is not, it will take on a slower and coarser growth than it would should its growth be pushed forward by the liberal use of a quick-acting fertilizer. In fact, all land for tobacco should be very liberally fertilized, for when poor land is planted in tobacco it is usually the case that the larger the yield the better will be the quality of the tobacco.

Now a few words about the use of cheap or low-grade fertilizers. I am aware of the fact that many farmers are trying to make tobacco by using 8-2-2 fertilizers. I cannot encourage the use of such mixtures for tobacco; for, if the tobacco plant takes less of phosphoric acid out of the soil than it does either of nitrogen or potash, it seems to me that, if we were to apply a sufficient quantity of an 8-2-2 mixture to a tobacco crop to meet its demands for nitrogen and potash, we should not fail to see that the quantity of phosphoric acid applied would be greatly in excess or out of all proportion to the needs of the crop.

So, gentlemen, if we would get the best results from our efforts at tobacco-growing, we must feed the crop balanced food, like we do our stock. Let us remember that the chief function or work of phosphoric acid in plant life is in the production of seed, and that we are not growing seed when we are growing tobacco leaf.

A FRUIT GARDEN FOR EVERY FARM.

By F. C. REIMER, Horticulturist, N. C. Experiment Station.

It is needless to say that every farm home should be supplied with a collection of the best fruits that can be grown in that section. There is nothing that the average individual is more fond of than good fruit. Every child and most grown people crave it. Physicians tell us that the acids in fruit serve necessary and beneficial functions in the digestion of food. This being true, one would expect to find every farm home supplied with a good fruit garden; that the table would contain a good supply of fruits for many if not all months of the year; that we would find rosy-cheeked children strolling around through the fruit garden; that the winter table would be made appetizing with good fruit; that the long winter nights would be made bright and merry with a bounteous supply of fruit.

This is what one should expect to find, but I am sorry to say that it is what he seldom does find. In traveling from the seashore to the mountains, the sad fact has been brought home to me that our farm homes are woefully lacking in this respect. Even in the oldest farm communities one seldom finds a good fruit garden. In place of it one usually finds sickly peach trees, and a few miserable, scrawny apple trees. It is with unusual delight that one finds now and then a fruit garden filled to its utmost with every fruit of the temperate climate. I am sorry to say that the most of this type have usually been found in towns and cities, and not around country homes. And this condition prevails in a State in which can be grown to perfection every fruit known to grow between Florida and Canada. What then is responsible for the condition of our fruit gardens?

There are several reasons, but the writer will confine himself to a consideration of only one, and that one of the most potent. This is the lack of varieties that are suited to local conditions. Trees are bought from tree peddlers, irresponsible nurserymen, and varieties unsuited to their conditions from reliable nurserymen. Such trees are planted with great hopes of future crops. These hopes are never realized. The trees soon succumb to an unsuitable climate, insects and disease. Many of them make vigorous trees but produce very little fruit, or fruit of poor quality.

The best way to get good results is to do your own propagation of fruit trees. By so doing you secure your trees very cheaply, you get trees and varieties that are best suited to your soil and climate, and you secure trees of those varieties which you like best. For example, you find a certain fruit in your section that you are very fond of, and one well suited to your section. It is a very simple operation to produce many trees just like it. This, I consider, by far the most important step in getting a good fruit garden. Many varieties are planted in localities to which they are not well suited. Propagate from those trees and varieties that have stood the test in your locality.

If you have a seedling tree of excellent quality, it is an easy matter to produce it true to kind. As an illustration of this, I will cite an excellent example: In the higher altitudes among our highest mountains, practically all of the varieties of peaches now propagated by nurserymen are a failure, still many seedling peach trees are grown successfully, and some of these are of excellent quality. Many of them are very inferior. In trying to reproduce the good ones from the seed, most of the offspring are usually different from the parent and inferior to it. What should be done? Propagate by budding those few seedling trees that are giving the best results in your section.

There is usually considerable difference among different trees of the same variety. The best of these can be reproduced; while in buying from nurserymen, one often gets trees propagated from inferior stock or stock of unknown origin.

Many different varieties can be grown on one tree. For example, by budding or grafting into the different branches as many different varieties can be grown as there are buds or grafts inserted. Peaches can be grown that

will ripen every month from June until November. This is of importance on the small place where only a few trees can be grown.

NOTE.—The speaker gave a demonstration showing how trees are propagated by the various methods. Specimens were also shown of trees that had been propagated by various methods in previous years.

Those interested should write to the North Carolina State Department of Agriculture for Bulletin January, 1906, written by H. H. Hume and F. C. Reimer on this subject, giving complete directions for the propagation of fruit plants.

HARVESTING THE CORN CROP.

By A. L. FRENCH, Rockingham County.

Various methods of harvesting the corn crop are in use in North Carolina. The first, and to my mind by far the most economical and practical, is by the use of the silo, as this is by far the best and cheapest method of securing the food value of the entire corn plant.

Three good horses hitched to a modern corn harvester and one man will cut and bind seven to eight acres of heavy corn per day, if the fields are in the condition they should be, viz., free of obstructions, cultivated level, and the rows are of reasonable length. Three teams, hitched to wagons with low wheels, can handle the corn bundles right off the ground. They are hauled to the silo, run through the cutter, packed away in the great tub, and the work of harvesting the crop is complete. By this means we have made nutritious, succulent feed of every ounce of the corn plant—stalk, blades, ears, shucks and tassel. We harvested a hundred tons this season, at a cost of \$40, hiring everything, engine, cutter, teams, hands, corn harvester, and furnishing coal. The whole cost of growing and harvesting this 100 tons of feed—enough to keep twenty-five cows six months—was less than \$100,* including interest and taxes on land.

The second best method of handling the crop is to cut and shock the corn, cutting either by hand or harvester. Place in large shocks, six to eight feet in diameter; let stand until thoroughly seasoned, last of October; then shred with machine or shuck corn by hand; bind fodder in large bundles, 16 to 18 inches in diameter, haul to the feeding lot, and stack in long ricks, the fodder to be cut later or fed entire, as seems most economical under the conditions existing. There is some economy in the hand shucking and feeding the whole fodder for the small farmer, as the work may done by the regular farm force and no outside expense incurred.

Either of the foregoing methods is so far ahead of the last method I will speak of as to make comparison impossible. I refer, of course, to the method formerly so much in vogue in North Carolina; that of pulling the blade fodder by hand, tying in bundles, hanging the bundles on the stalks to cure, then carrying them out by hand, loading into wagons, hauling out of the fields and stacking around a pole. Then the tops must be cut, shocked and handled in the same way. Then the ears, when dry, must be pulled, thrown on the ground in piles, picked up by hand, thrown into the wagons, hauled to the crib; thrown on the ground again, shucked by hand, the ears thrown into the crib, the shucks in another place; when the work is done, save that shucks are sometimes cut by a machine run by hand-power later, before being fed.

By careful experiments, we have found that on our farm, with our help, we can secure about eight times the feed at the same cost by the method of hand-cutting the entire plant than we can by the last named method, and I ask you, thinking farmers: Is it good business sense to continue longer a practice that is so expensive? Use either of the better methods I have described; but don't pull fodder.

OAT CULTURE.

By R. L. SHUFORD, Catawba County.

I grow oats, because I have found them more profitable than any other grain. I can grow more bushels per acre than I can of corn, and the cost is considerably less. While the feeding value is not as much as that of corn, they have been bringing about the same as corn on our markets.

I have grown from both fall and spring seeding, and usually get good results from spring seeding, but fall seeding generally makes a better yield and heavier grain. But the land is left in better shape, where fall or winter plowed for a pea or corn crop to follow after the oats have been taken off. When sown in the fall, the land should be well prepared with good firm seed bed, and, I think, should not be sown too early. I usually sow after the middle of October. If sown too early, they may get too large before cold weather, consequently be injured by freezing, particularly if of the Apler, Red Rust-proof or Burt, or any of the earlier varieties. I have always succeeded better with the early than the later kinds. While they do not make as much straw, the yield of grain is much better. I have found the Apler the most productive, weighing much more to the bushel than the Burt. I have never made an entire failure from fall seeding, although many complain that oats will not stand the winter freezing. I think the trouble is in not having their land well prepared before sowing. If land is reasonably fertile and well prepared, and oats put in with a grain drill, so that the seed are covered the right depth, so they will germinate quickly and get well rooted before cold weather, there will be no trouble from winter freezing. I seldom use any commercial fertilizer on oats, although I believe it pays quite as well as on other grain, particularly in spring sowing. I usually sow fall oats on pea or corn stubble. Then I never plow before sowing, but use the disc harrow until the land is properly pulverized. Should it be too hard to get in condition at the right time, I think it best to leave it until spring sowing. This gives one a chance to fall or winter plow the land, which is very important on our heavy, red clay soil. I am never uneasy about getting this kind of land plowed too deep, when there is time for the winter freezes to pulverize it. When the weather conditions are right, I sometimes sow in February. I have gotten good results from oats sown the last of March. I have always had excellent results from oats grown after a cotton crop. I believe it pays on spring sowing always to use the harrow or weeder, particularly if the weather is dry, as it helps to hold the moisture.

THE PLACE LIVE-STOCK SHOULD OCCUPY IN NORTH CAROLINA FARMING.

Address of MR. A. L. FRENCH, of Rockingham County, before the State Farmers' Convention, in Raleigh, August 30, 1907.

No State in the Union is better fitted by nature to produce all classes of live-stock than is North Carolina. From Currituck to Cherokee conditions exist which, if taken advantage of, will insure a profitable live-stock business for our farmers. Conditions are such over a large part of our State that our farms cannot be handled with any profit without the help of live-stock.

In other sections the greatest profit can be secured only by the aid of live-stock to a greater or less degree. Farming, to be made the most profitable for a term of years, both for the farm and farmer, requires that a good rotation of crops be followed, in which the legumes play an important part. North Carolina is spending five to six millions of dollars each year for the purchase

of nitrogen. Almost every dollar of this vast sum may be saved by our farmers, when the legumes are given their proper place in our agricultural scheme.

HOW LIVE-STOCK ADDS VALUE TO THE LEGUMES.

The leguminous plants have a three-fold value to the farmer, (1) as humus makers, (2) as nitrogen gatherers, and (3) as food for animals. The first two values may be obtained without the aid of live-stock, but, as I will endeavor to point out, they are obtained at too great a sacrifice of food value. Take only one example, that of the cowpea: Two tons of this most popular legume grown on one acre of land will produce about \$25 worth of plant food, and its value as humus will be at least one-half of this sum. That is to say, that, if we allow two tons of cowpea-vine to remain on the acre of land on which it was produced, we will have added to the soil some \$38 worth of plant food and humus. But this two tons of pea-vine, when harvested as hay, has a food value of from \$25 to \$27. Now, if we plow this valuable food in we are losing altogether more than we can afford to lose. It is not good business to bury \$25 in each acre of our land when we can, with a little labor and at small expense, secure the manurial, the humus, and the food values of this legume. The harvesting of the two tons of pea-vine may be accomplished, by the use of machine-tools, at a cost of \$3 at the most. The product may be fed to animals and the manure returned to the land at a cost of not more than \$1. The humus value of the plants will be the same whether plowed under in the natural state or after having passed through the animal. But in the feeding of the product less than twenty-five per cent of the plant-food value will have been lost, going to make up animal tissue and later sold from the farm.

GETTING THE MOST OUT OF HOME-GROWN FEED.

So we will charge our feeding account with twenty-five per cent of the plant-food value, or \$6.25; adding the cost of harvesting and feeding to this, we have a total of \$10.25 to be subtracted from the food value of the hay (\$27), and have as the result \$16.75 as clear profit per acre to pay us for our enterprise in handling the product in this up-to-date business manner. Further, we return our manure to the poorer sections of the field, where the humus and plant food are *most* needed, instead of turning in the bulk of the pea-vine on the richest spots, on which the bulk of it was produced, and where it is least needed.

We plow under millions of dollars worth of cotton-seed meal each year for fertilizer, when we could just as well secure both three-fourths of the manurial and all the food value by combining it with corn silage and feeding to first-class animals. The foregoing part of my talk applies more particularly to the eastern section of our State.

HOW LIVE-STOCK MAY BRING A PROFIT FROM ROUGH LAND.

Now let us turn our attention for a little to the Piedmont section. All over this vast section—probably the most fertile of our State—may be seen thousands and thousands of acres of land lying idle, growing up in worthless brush and briars, bringing not a cent to its owners. All these vast acres should be producing grass, on which to graze *first-class* cows, hogs, sheep and horses. The rougher portions of this land can never be made profitable plow land because of the great loss (by washing) of soil and fertility which attends the plowing and working of this character of soil. So the only course, in our opinion, open to the farmers of this favored section is the production of live-stock, hay and grass, uses to which this section is especially adapted.

The people of our mountain section have already found that only in live-stock farming can they hope to attain to the greatest success; and our north-western counties, with their clean fields, productive meadows, and fine, nicely painted homes, are as good an argument as we need to convince the most skeptical as to what live-stock can do in a country, and I am glad to know of the increasing numbers of good animals being produced in this section. Only one thing, in my opinion, stands in the way of doubling the number of

animals produced annually in this section, and that is the scarcity of level land on which to produce the feed for carrying the young stock through the first winter. This trouble will be overcome, I am sure, in the near future, by the introduction of the silo, by means of which immense quantities of fine, succulent food may be produced from small areas of land. When this time comes, we expect to see our mountain section disposing of the bulk of her feeders as yearlings instead of as twos and threes, as at present, and thus, by feeding only young, growing animals, secure the greater profit to be obtained by handling this class of stock.

LIVE-STOCK HELPS TO SOLVE THE LABOR PROBLEM.

The labor problem is becoming more and more troublesome from year to year, and it seems almost a necessity that the North Carolina farmer find some means of handling his farm other than by hand-labor. On a well-regulated stock farm the hand-labor necessary for the handling of a good-sized business is reduced to the minimum. The animals themselves harvest without cost—except for fencing—all the feed consumed during six to eight months of the year. The winter feed required may be, and is, grown and handled principally by the use of large tools, operated by horse-power, consequently the cost of production is low; and, too, the live-stock will consume large amounts of the by-products of grain-growing, that are worth very little on the markets, but which must be made use of to the best advantage if the farmer wishes to reap the highest reward for his labor.

A LITTLE OBJECT LESSON.

On our little farm of 240 acres we employ only one hand, and our total expense for labor for one year, including filling the silo, under \$200, not counting my own and the labor of our twelve-year-old lad. During the past year our farm produced in crops and pasture—at the market price for such products in our neighborhood—\$3,264. We handle absolutely nothing but live-stock—cattle, hogs, and sheep, with an occasional colt—and crops for the winter feeding of the same. In other words, we practice what we preach, breed and feed first-class live-stock, make a living, and something besides, by the practice, and the farm is increasing in value about \$1,500 per year. I believe we shall continue right along this line.

And, in traveling over our State, I am gratified to see the advancement being made in the live-stock business. A little seed has fallen here and there during the past few years, which is springing up, and the fruit is becoming apparent on all sides. Let the good work go on; it is the greatest force we have for the upbuilding of the agriculture of our State.

THE BREEDING AND CARE OF THE DAIRY HERD.

By R. L. SHUFORD, Catawba County.

This is an age of specialties, and every dairyman should be a specialist, and should have a special-purpose cow. By a special-purpose cow I mean one that produces the greatest profit from her milk product. Her business is to convert feed into milk at a profit. The scales and the Babcock test will tell us the amount of the product. It does not matter so much what breed of cow it is, if you know her performance. Of course, for dairy work we must select one of the dairy breeds. I am glad to say that this style of cow is not confined to any particular breed, but that the Holsteins, Jerseys, Guernseys and Ayreshires are all entered in the great breed race of to-day, and it is left for us to decide which particular breed we will choose. Right here I might say that it would be folly to cross any of the breeds. We would be simply

tearing down what our best breeders have spent many years in building up. After you have selected your breed, stick to it.

The real value of a fine milk cow lies not alone in her powers of production. Her prepotent power of heredity, that power received from a long line of good ancestors, which enables her to pass her good qualities on to her offspring. So a great deal depends on whether the man is wise in selecting the kind of animals for the work; and, with the proper care and feed, there is nothing to hinder the dairyman from being master of the situation and having conditions favorable to his ambition.

HOW WE MAY CHOOSE A DAIRY COW.

There are certain rules laid down with which we ought to be familiar, and if we follow them, we will not go very far wrong in picking out a dairy cow. These rules were not made and then a cow made to fit them, but some of the greatest milk and butter producing cows were taken, and they were found all to be of a certain type or form, and this was adopted as a standard for a dairy cow. There are, of course, exceptions to these rules, but, to the breeder who is trying to bring his herd up to the highest point of profit, this dairy type of cow is the one most sure of transmitting her good qualities to her offspring.

The sire is half the herd, and in his selection the best is none too good. See that he is from good producing ancestors, and also that he has constitution and vigor. I think that it is a well-established fact that the most prepotent sires are the ones with lots of vigor and vim. Give him plenty of exercise and don't burden him with an over-abundance of fat, for possibly this tendency may be transmitted to the young, and this is not a desirable characteristic for dairy work.

CARE OF THE YOUNG STOCK.

The usefulness of the dairy cow depends largely upon the care and development she gets for the first two years of her existence. I believe it possible, with improper feed and care, to injure calves so as to impair their future usefulness. Their digestive organs are dwarfed and stunted the same as their bodies, and later on, when we ask them to take a lot of feed and convert it into milk and butter fat, they say: "We can't do it; we have not been developed and brought up the right way." So it stands us in hand to look out for the little fellows, and not only see that they are bred right, but that they are cared for and fed right, and kept in good growing condition every day, with good wholesome feed and exercise. I think many have made the mistake of breeding heifers too young. This has a tendency to dwarf them in size, constitution and vigor. Grow them well; and if a heifer, after having been bred, lays on considerable flesh, don't get frightened. If she has been bred right, "blood will tell," and when she comes to freshness she will need all of this surplus flesh to tide over this period until she gets into good working condition. A heifer's first milking period is a critical time in her development. Habits are often formed this year that are to possibly remain with her for life, one of which is persistency in milking. Give her a long milking period the first year, that she may get the habit of giving milk a long time established.

STUDY THE PERFORMANCE OF EACH COW.

The Babcock test, scales and milk-sheet are a necessity. The three taken together tell the whole story; they tell us whether we have cows that are keeping us, or whether we are keeping them. As a matter of business every dairyman should study the individuality of every cow and know the amount of milk each one produces, so as to be able to weed out the "boarders" and get his herd on a good paying basis.

There is much to be read between the lines of the milk-sheet. It not only tells how much milk each cow has given in a year, but shows the persistency, by telling how many days she was in milk, and, if you have been changing feed, whether the feed has been one of profit or loss. It is also an incentive

to better work on the part of the hired help, as I find they are more careful to get the last drop, to try and beat yesterday's work. In fact, it makes it a race all the way through. There is never a day passes but what I hear my milkers arguing as to which has the best cows. One will say, "My cow gives the most milk," and another will say, "Mine is the richest," or, "My cow beat yours for a week, or a month, or a year," as the case may be. They take as much interest in the test as I do myself. It also shows the variation in milk yield, and sets one to thinking what is the cause and how to remedy it. We cannot all be Van Pelts as feeders, but it is certainly interesting work to watch the different cows in the herd and feed them so that they will constantly improve in production.

FEEDING THE DAIRY COW.

I think, to operate a dairy profitably, the first essential is an intelligent dairyman; the second, good cows; and the two combined make the third, which is proper feeding. The feeding question is, perhaps, the most important question of all, for upon the proper feeding depends the profitability of the herd, and upon it also depends their highest development.

The words "scientific feeding" seem big for some to comprehend, but, after all, they mean only rational feeding—good common sense mixed with good judgment, and knowing the needs of different animals. We see a great deal about a balanced ration. It is simply a statement of the results of experiments and observation. No fixed standard can really be laid down for all conditions, and the feeder must come down to his own good judgment. I think that one of the greatest faults of dairymen in general is not so much a lack of knowledge as of application. We *know* a great deal better than we *do*. We are too slow in taking up the more advanced methods of caring for our stock.

HOW TO SUCCEED.

The successful man to-day is the one who is alive to all the details of his business. It is not alone the breeding that is going to determine the future usefulness of the animal, but this must be combined with the daily care, feeding and careful observation. That is going to make the cow what she should be. I believe the best plan for the average farmer, unless he has plenty of money, in starting a dairy herd, is to take a few well-selected animals and breed up to the size of the herd desired. This plan takes time, but it will be the most satisfactory in the end. In the first place, most people without experience are not adapted to the thoroughbred or the highly-bred animal, and from experience in the breeding up of the herd will come the education necessary to care for a herd of this character.

The successful dairyman must be interested in his business. It would be more than folly to try to make a success of something you could not get interested in and really did not care for or enjoy. You must think a lot of your cows and make real pets of them.

**REPORT FROM LEAF-TOBACCO WAREHOUSES FOR MONTH OF
SEPTEMBER, 1907.**

Pounds sold for producers, first hand.....	19,859,656
Pounds sold for dealers.....	516,605
Pounds resold for warehouse.....	1,328,858
Pounds resold for other warehouses.....	5,989
Total.....	<u>21,711,108</u>

**REPORT FROM LEAF-TOBACCO WAREHOUSES FOR MONTH OF
OCTOBER, 1907.**

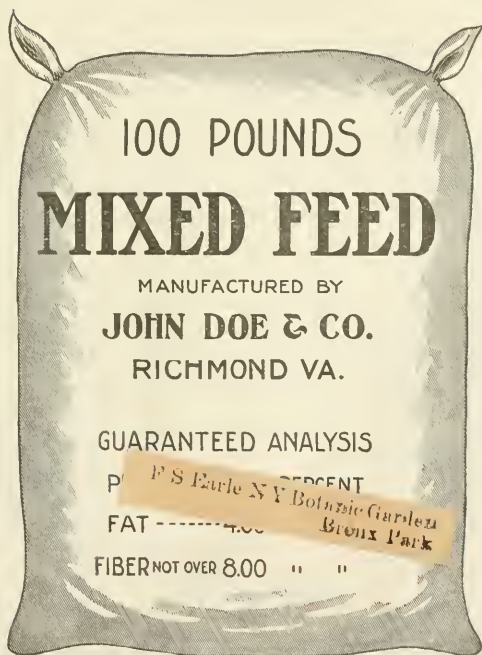
Pounds sold for producer, first hand.....	18,765,861
Pounds sold for dealers.....	601,383
Pounds resold for warehouse.....	1,079,439
Pounds resold for other warehouses.....	52,821
Total.....	<u>20,499,504</u>

THE BULLETIN

OF THE

North Carolina Department of Agriculture.

STOCK FEEDS.



A PROPERLY BRANDED BAG OF FEED.

NOVEMBER, 1907.

THIS BULLETIN IS SENT FREE TO FARMERS ON APPLICATION.

STATE BOARD OF AGRICULTURE.

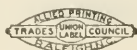
S. L. PATTERSON, Commissioner, *ex officio* Chairman, Raleigh.

J. J. LAUGHINGHOUSE.....	Greenville	First District.
C. W. MITCHELL.....	Aulander	Second District.
WILLIAM DUNN.....	New Bern	Third District.
ASHLEY HORNE.....	Clayton	Fourth District.
R. W. SCOTT.....	Melville	Fifth District.
A. T. MCCALLUM.....	Red Springs	Sixth District.
J. P. McRAE.....	Laurinburg	Seventh District.
R. L. DOUGHTON.....	Laurel Springs	Eighth District.
W. A. GRAHAM.....	Machpelah	Ninth District.
A. CANNON.....	Horse Shoe	Tenth District.

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HAMPDEN HILL.....	Assistant Chemist.
S. C. CLAPP.....	Nursery and Orchard Inspector.

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 F. T. MEACHAM, Superintendent Iredell Test Farm, Statesville, N. C.
 JOHN H. JEFFERIES, Superintendent Pender Test Farm, Willard, N. C.
 R. W. COLLETT, Superintendent Transylvania Test Farm, Blantyre, N. C.



THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 11.

Entered at the Raleigh Post-office as second-class mail matter.

THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, NOVEMBER, 1907.

FIFTH REPORT ON CONCENTRATED FEEDING STUFFS AND COTTON-SEED MEAL.

B. W. KILGORE, STATE CHEMIST.

BY C. D. HARRIS, (ASSISTANT CHEMIST AND MICROSCOPIST IN CHARGE
OF INSPECTION AND ANALYSIS OF FEEDS),

AND

L. L. BRINKLEY AND HAMPDEN HILL.

Since the publication of the last Bulletin on Concentrated Feeding Stuffs, 711 samples of feeds and cotton-seed meals have been examined. The number of samples of each kind is as follows:

Wheat Bran	72
Mixed Brans	13
Middlings, or Shorts.....	63
Brans and Shorts.....	19
Brown Shorts	4
Shipstuff	65
Corn and Oat Feeds.....	18
Rice Feeds	16
Molasses Feeds	39
Beet Pulp	6
Hominy Feeds and Chops.....	38
Cotton-seed Feeds	21
Special Mixed Feeds.....	13
Meat Feeds	3
Miscellaneous Feeds	65
Miscellaneous Feeds, Examined Microscopically.....	151
Cotton-seed Meals	105
Total	711

PLACES AT WHICH SAMPLES WERE COLLECTED.

Clayton	1	Edenton	6
Catawba	1	Rocky Mount	10
Thomasville	1	High Point	13
Marshall	1	Charlotte	20
Laurinburg	7	Reidsville	16
Gastonia	14	Tarboro	2
Fayetteville	19	Wilson	19
Wadesboro	14	Goldsboro	27
Monroe	5	Kinston	14
Smithfield	6	Hendersonville	12
Maxton	5	Concord	11
Selma	2	Henderson	8
New Bern	19	Greensboro	20
Scotland Neck	6	Salisbury	16
Rockingham	12	Hickory	11
North Wilkesboro	2	Morganton	11
Durham	5	Greenville	4
Hamlet	8	Elizabeth City	5
Mt. Airy	9	Murphy	4
Lexington	2	Lenoir	2
Bessemer City	2	Method	1
Lumberton	9	Guilford College	1
Jonesboro	5	Louisburg	1
Sanford	8	Whiteville	1
Hope Mills	1	Aberdeen	5
Shelby	1	Moncure	3
Raleigh	55	Dillsboro	1
Asheville	28	Rural Hall	1
Washington	14	Brodie	1
Waynesville	6	Marion	1
Wilmington	26	Red Springs	1
Statesville	18	Pittsboro	2
Winston	31		

Besides the above, a large number of samples have been sent in and analyzed for manufacturers outside of the State, as well as for farmers, dealers and manufacturers within the State.

STANDARDS ADOPTED.

As the present law requires that every bag must have a guaranteed analysis attached, and gives the Department the right to adopt standards for the different feeds, the following standards have been adopted. For Pure Wheat Bran, Pure Wheat Shorts, and Pure Wheat Bran and Shorts mixed:

	<i>Protein.</i>	<i>Fat.</i>	<i>Crude Fiber.</i>
Wheat Bran	14.5	4.00	9.5
Middlings	15.00	4.00	6.00
Bran and Shorts	14.5	4.00	8.00

Standards for the other feeds will be adopted as soon as this Department has had time to accumulate enough information and analyses to justify it in adopting standards that will be fair to both manufacturers and consumers.

DUTY OF THE DEPARTMENT OF AGRICULTURE.

It is the duty of the Department of Agriculture to see that all feeds are properly marked, to collect and examine them in order to note whether they are as represented, and to publish the results for the benefit of all interested parties.

The Department also analyzes free any sample of feeding stuff sent in.

The Department stands ready, through correspondence and through the personal services of its regular inspectors, to furnish whatever information it may possess concerning the character and nutritive value of all feed stuffs.

NOTES REGARDING SOME OF THE NEWER FEEDS.

Molasses or Sugar Feeds.—Under this head is grouped Sucrene Feeds, Saccharine Dairy Feed, and Mueller's Molasses Grains. There are three feeds manufactured by the American Milling Company, of Chicago, namely, Sucrene Dairy Feed, Sucrene Horse Feed, and Sucrene Horse, Mule and Ox Feed. These feeds have been sold in the State in large quantities during the past year. Sucrene Dairy Feed is a mixture of a wheat product, corn product, oats, barley, malt sprouts, cotton-seed meal, molasses, and weed seeds. It is guaranteed to contain: Protein, 16.50 per cent; fat, 3.50 per cent, and crude fiber, 12.00 per cent. Sucrene Horse Feed is a mixture of a wheat product, corn product, cotton-seed meal, oats, oat hulls, molasses, and weed seeds. It is guaranteed to contain: Protein, 13.50 per cent; fat, 3.50 per cent. Sucrene Horse, Mule and Ox Feed is a mixture of corn, oats, distillery product, molasses, and weed seeds. It is guaranteed to contain: Protein, 10.00 per cent, and fat, 3.00 per cent. These feeds are up to their guarantee, and when inspected were in good condition.

Mueller's Molasses Grains do not seem to be a definite mixture, as some shipments have different ingredients from others, and consequently different samples of this feed do not analyze the same.

Saccharine Dairy Feed, made by Lewis Leonhardt & Co., of Knoxville, Tenn., is about 4 per cent under its guarantee in protein, and, besides, contains rice chaff. The use of rice chaff in this feed is an adulteration and in violation of the feed law. This feed is not up to its guarantee.

Molasses feeds dry out quickly, losing weight and palatableness, and for these reasons should be bought in such quantities as can be readily used in a short time.

Cooked Feeds.—Experiments have been conducted in many States to ascertain the facts in regard to the advisability of cooking feeds for farm stock. The results of these investigations have been that it does not pay to cook food for stock when such food will be satisfactorily consumed without cooking, for cooking does not increase the digestibility of feeding stuffs, but may lower it, and there is considerable expense involved in the operation. Feeders should not confuse the effects of cooked feeds upon farm stock with the advantage of supplying them with warm feed in a palatable form.

A horse feed and a cow feed manufactured by the Southern Cooked Feed Company, of Nashville, Tenn., have been sold in this State during

the past year as cooked feeds. The cow feed is guaranteed to contain 26.00 per cent protein, 7.50 per cent fat, and 8.20 per cent crude fiber. This feed is made up largely of malt sprouts, barley and cotton-seed meal. The horse feed is guaranteed to contain: Protein, 12.50 per cent; fat, 5.64 per cent; crude fiber, 9.54 per cent. This feed is made up largely of cracked corn, oats, and barley. The analyses of these feeds appear in this Bulletin, under Special Mixed Feeds.

Corn and Oat Feeds.—In this Bulletin will be found the analyses of what in general terms are known as Corn and Oat Feeds. Representative feeds of this class are branded Victor Corn and Oat Feed, Boss Corn and Oat Feed, Boss Chop Feed, Purina Feed, Excelsior Corn and Oat Feed, etc. The quality of these feeds is very variable, and in many cases so inferior that the purchaser, to protect himself from deception and fraud, should study closely the analyses of these products, and especially the ingredients of which they are composed. The bulk of all these feeds is ground oat hulls with admixture of some ground corn and oat kernels. The price paid for these feeds is, as a rule, far in excess of their feeding value, when compared with wheat bran, middlings, and cotton-seed meal.

Brown Shorts.—Some feeds have been found on sale in this State during the past year branded "Brown Shorts." Some of them are entire wheat products, while others are mixtures of wheat products with other materials. This Department rules, under authority of the feed law, that any feeding stuff branded or labeled "Brown Shorts" must be an entire wheat product. Mixtures of wheat products with other substances and branded "Brown Shorts" is a violation of the law, and the sale of such mixtures so branded is prohibited in this State.

Cracked Corn.—This Department has experienced considerable trouble during the past year with this product being shipped into the State without the guaranteed analysis attached, and also in different weight bags from those prescribed in the feed law. Cracked Corn comes under the feed law when sold as feed for domestic animals, and, therefore, must bear a guaranteed analysis showing the minimum per cent of protein and fat and the maximum per cent of crude fiber it contains. The sale of this product in any other size bags than those prescribed in the feed law is prohibited.

Meat Feeds.—Under this head is grouped such feeds as Rava Meat Meal, Darling's Beef Meal, etc. These feeds are very high in protein, and therefore command a high price. To avoid waste of money, these feeds should be fed intelligently.

Special Mixed Feeds.—Under this head is grouped proprietary, trademarked and specially named feeds. Feeds should never be purchased because they have a fancy name. There is nothing in a name. Names are oftentimes misleading and deceiving as to the true quality of the product. This class of feeds should be purchased according to the analyses they bear, and not because they have an attractive name.

Shipstuffs.—This name does not imply a mixture of any definite composition; therefore, when purchasing feeds branded "Shipstuff," the buyer should be guided by the guaranteed analysis on the bags. This

analysis gives the true quality of the goods and indicates whether the feed is a mixture or entire wheat product.

Rice Feeds.—These feeds vary very much in composition, and some contain large percentages of rice chaff. The per cent of crude fiber found in them will indicate to some extent the amount of chaff they contain. The higher the per cent of crude fiber the more chaff they contain. Rice feeds have a high fat content, and for this reason their keeping quality is rather poor. The guarantee on these feeds should be closely inspected before purchasing.

**ANALYSES OF SAMPLES OF CONCENTRATED FEEDING STUFFS,
SEASON 1907.**

On the following pages will be found the results of the chemical and microscopic examinations of the samples of concentrated stock feeds collected by the inspectors of the Department, and those sent in by farmers, dealers and manufacturers. These analyses, with the discussion of the results which follow them, are deserving of careful consideration on the part of all local dealers and also feeders.

WHEAT BRAN.

Wheat bran is the by-product from the manufacture of flour. It carries a considerable amount of crude fiber somewhat resembling straw in this par-

RESULTS OF THE EXAM

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1602	Bran -----	Adams Grain and Provision Co., Charlotte.	J. F. McNair, Laurinburg, N. C.	Jan. 12, '07
1802	---do-----	Akin-Erskine Milling Co., Evansville, Ind.	W. A. Myatt, Raleigh, N. C.	July 4, '07
1642	---do-----	Atlanta Milling Co., Atlanta, Ga.	Sent in by mill -----	Feb. 22, '07
1895	---do-----	Asheville Milling Co., Asheville, N. C.	J. H. Jenkins, Asheville, N. C.	Aug. 26, '07
1453	---do-----	Ballard & Ballard, Louisville, Ky.	Adams Grain and Provision Co., Charlotte, N. C.	Dec. 17, '07
1659	---do-----	---do-----	Spencer & Harriette, New Bern, N. C.	March '07
1856	---do-----	---do-----	Coe Brothers, Greensboro, N. C.	Aug. 1, '07
1878	---do-----	Andrew Bowling, Staunton, Va.	Hutchison Bros., Reidsville, N. C.	Aug. 2, '07
1723	---do-----	Carolina Roller Mills, Durham, N. C.	J. T. Rogers & Co., Durham, N. C.	Mar. 4, '07
1639	---do-----	Cockade City Mills, Petersburg, Va.	Sent in by mill -----	Feb. 19, '07
1725	---do-----	Cumberland Mills, Nashville, Tenn.	George Marsh & Co., Raleigh, N. C.	Mar. 24, '07
1468	---do-----	---do-----	J. C. Eason & Son, Goldsboro, N. C.	Dec. 15, '06
1675	---do-----	Dan Valley Mills, Danville, Va.	Wells Grocery Co., Wilson, N. C.	Mar. 20, '07
1728	---do-----	---do-----	Cooper & Gill, Statesville, N. C.	Mar. 9, '07
1480	---do-----	---do-----	Best & Thompson, Goldsboro, N. C.	Nov. 15, '07
1893	---do-----	Dillsboro Milling Co., Dillsboro, N. C.	Seigler & Co., Asheville, N. C.	Sept. 26, '07
1475	---do-----	Dunlop Mills, Richmond, Va.	J. Havens, Washington, N. C.	Nov. 21, '06
1474	---do-----	---do-----	E. A. Kelly & Co., Henderson, N. C.	Dec. 24, '06
1668	---do-----	---do-----	Edwards & Pegram, Kinston, N. C.	Mar. 20, '07
1815	---do-----	---do-----	---do-----	July 18, '07
1483	---do-----	Eagle Roller Mill Co., New Ulm, Minn.	John S. McEachern, Wilmington, N. C.	Nov. 16, '06
1484	---do-----	---do-----	Worth & Co., Wilmington, N. C.	Nov. 11, '06
1870	---do-----	Forsyth Roller Mills, Winston-Salem, N. C.	P. R. Lamb & Co., Winston-Salem, N. C.	Aug. 5, '07
1489	---do-----	---do-----	Farmers Trade House, Winston-Salem, N. C.	Dec. 21, '07
1735	---do-----	Horne Bros. & Johnstone, Mocksville, N. C.	Kluttz & Rendleman, Salisbury, N. C.	Mar. 3, '07
1520	Bran -----	Harrisonburg Milling Co., Harrisonburg, Va.	Geo. Marsh & Co., Raleigh, N. C.	Dec. 5, '06
1646	---do-----	The Hauser Mill Co., Dillsboro, N. C.	Sent in by mill -----	Feb. 24, '06
1610	---do-----	Henderson Roller Mill, Monroe, N. C.	Collins & Biggs, Monroe, N. C.	Jan. 15, '07
1611	---do-----	---do-----	McRae Mercantile Co., Monroe, N. C.	Jan. 15, '07
1533	---do-----	Hickory Milling Co., Hickory, N. C.	Thompson Grain and Feed Store, Salisbury, N. C.	Dec. 19, '06
1534	---do-----	---do-----	W. A. Myatt, Raleigh, N. C.	Dec. 5, '06
1522	---do-----	Horne Bros. & Johnstone, Mocksville, N. C.	Kluttz & Rendleman, Salisbury, N. C.	Dec. 19, '06

ticular. It differs from straw, however, in that the inner surface of the bran flakes is made up of the nutritious layer of the wheat grain, which is rich in protein and fat. To be of good quality it should contain 15½ per cent. protein.

INATION OF BRANS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1602	-----	100	14.50	4.00	9.50	-----	16.12	3.71	6.50	4.65	Wheat product.
1802	-----	100	15.66	3.17	10.12	-----	14.87	3.15	8.90	6.87	do.
1642	-----	-----	-----	-----	-----	-----	15.75	4.88	8.92	-----	do.
1895	-----	80	13.00	3.00	9.50	-----	16.63	4.78	7.10	5.61	do.
1453	-----	100	15.25	4.60	9.08	-----	15.75	4.45	9.85	6.50	do.
1659	1.50	100	16.58	4.82	8.04	-----	15.87	4.05	8.49	6.53	do.
1856	-----	100	16.58	4.82	8.04	-----	15.56	4.15	8.65	6.00	do.
1878	-----	100	14.50	4.00	9.50	-----	15.37	4.46	8.23	6.00	do.
1723	-----	-----	-----	-----	-----	-----	14.50	2.93	5.12	5.00	Wheat and corn product.
1639	-----	-----	-----	-----	-----	-----	14.50	4.50	8.80	-----	do.
1725	-----	100	14.50	4.00	9.50	-----	14.25	3.39	10.10	5.95	Wheat product.
1468	-----	100	14.50	4.00	9.50	-----	14.00	5.01	9.50	6.95	do.
1675	-----	100	14.50	4.00	9.50	-----	14.22	3.47	8.93	5.55	do.
1728	1.60	100	14.50	4.00	9.50	-----	14.12	1.41	7.60	5.55	do.
1480	1.45	100	14.50	4.00	9.50	-----	14.50	5.25	8.63	7.14	do.
1893	-----	80	14.00	3.50	9.00	-----	15.50	4.58	8.65	6.25	do.
1475	1.50	100	14.50	4.00	9.50	-----	15.50	4.92	7.78	6.70	Wheat bran.
1474	-----	100	14.50	4.00	9.50	-----	14.50	5.25	8.00	6.60	do.
1668	1.50	100	14.50	4.00	9.50	-----	13.90	4.14	7.75	6.71	Wheat product.
1815	1.50	100	14.50	4.00	9.50	-----	15.37	3.72	-----	5.90	Wheat bran and corn bran.
1483	1.25	80	15.89	3.85	-----	-----	15.62	3.77	9.93	6.53	Wheat product.
1484	1.25	80	15.89	3.85	-----	-----	15.87	3.97	9.83	6.77	do.
1870	-----	100	14.50	4.00	9.50	-----	15.00	3.95	6.75	4.63	Wheat bran and corn bran.
1489	-----	100	14.50	4.00	9.50	-----	14.63	3.95	9.53	6.35	Wheat product.
1735	1.50	100	15.50	3.50	9.00	-----	14.36	3.23	7.30	5.30	do.
1520	-----	100	17.25	4.61	10.70	-----	15.75	4.27	9.34	6.30	Wheat product.
1646	-----	-----	-----	-----	-----	-----	16.62	5.40	8.29	-----	do.
1610	1.30	100	16.10	4.20	6.75	-----	14.75	3.73	8.85	6.48	do.
1611	1.50	100	16.10	4.20	6.75	-----	14.87	-----	8.80	5.31	do.
1533	1.25	80	15.00	3.90	7.54	-----	16.00	3.93	6.50	4.97	do.
1534	1.45	100	15.00	4.00	6.00	-----	16.12	3.52	6.53	4.87	do.
1522	1.50	100	15.50	3.50	9.00	-----	16.75	5.79	8.90	-----	do.

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1521	Bran -----	-----do-----	C. D. Shelby & Bro., Charlotte, N. C.	Dec. 17, '06
1419	-----do-----	Julian Milling Co., Julian, N. C.	Sent in by mill -----	-----
1535	-----do-----	J. M. Koiner, Grottoes, Va.	Standard Feed and Seed Co., Winston, N. C.	Dec. 21, '06
1542	-----do-----	Liberty Mills, Nashville, Tenn.	S. H. Miller, Asheville, N. C.	Dec. 14, '07
1541	-----do-----	-----do-----	B. F. Mitchell & Co., Wilmington, N. C.	Nov. 16, '07
1654	-----do-----	-----do-----	Best & Thompson, Goldsboro, N. C.	Mar. 18, '07
1739	-----do-----	-----do-----	J. E. Marshburn, Wilmington, N. C.	Mar. 28, '07
1866	-----do-----	-----do-----	J. H. Burton, Reidsville, N. C.	Sept. 20, '07
1880	-----do-----	J. D. Manor & Co., New Market, Va.	Sent in by mill -----	Oct. 23, '07
1760	-----do Go-Far-----	New Prague Flouring Mill Co., New Prague, Minn.	Adams Grain and Provision Co., Maxton, N. C.	Mar. 27, '07
1701	-----do-----	Page Milling Co., Luray, Va.	Sent in by mill -----	April 6, '07
1883	-----do-----	Phoenix Flour Mills, Evansville, Ind.	-----do-----	Oct. 24, '07
1515	-----do-----	Piedmont Mills, Lynchburg, Va.	R. G. Hyatt, Greensboro, N. C.	Dec. 7, '06
1547	-----do-----	Read Bros., Morristown, Tenn.	J. L. Smathers, Murphy, N. C.	Dec. 12, '06
1546	-----do-----	-----do-----	King & Marshall, Hendersonville, N. C.	Dec. 14, '06
1594	-----do-----	-----do-----	J. V. Leonard, Catawba, N. C.	-----
1767	-----do-----	-----do-----	Bessemer Mercantile Co., Bessemer City, N. C.	-----
1626	-----do-----	J. Allen Smith & Co., Knoxville, Tenn.	Hardison Co., Wadesboro, N. C.	Jan. 14, '07
1670	-----do-----	-----do-----	Hooker, Churchill & Co., Kinston, N. C.	Mar. 20, '07
1900	-----do-----	-----do-----	Sent in by mill -----	Oct. 27, '07
1809	-----do-----	-----do-----	A. E. Rankin & Co., Fayetteville, N. C.	July 17, '07
1634	-----do-----	Southern Mills, Nashville, Tenn.	M. C. Winston Co., Selma, N. C.	July 10, '07
1556	Bran -----	Southern Mills, Nashville, Tenn.	P. R. Lamb & Co., Winston, N. C.	Dec. 21, '06
1555	-----do-----	-----do-----	Hutcherson Bros., Reidsville, N. C.	Dec. 6, '06
1771	-----do-----	Star Mills, Nashville, Tenn.	Asheville Grocery Co., Asheville, N. C.	April 11, '07
1559	-----do-----	Statesville Flour Mills, Statesville, N. C.	Forney & Co., Morganton, N. C.	Dec. 11, '06
1560	-----do-----	-----do-----	Chismon Bros., Greensboro, N. C.	Dec. 7, '06
1436	-----do-----	-----do-----	Sent in by mill -----	Nov. 26, '07
1855	-----do-----	Sunnyside Flour Mills, Evansville, Ind.	Sent in by mill -----	Aug. 15, '06
1814	-----do-----	Tennessee Mill Co., Estill Springs, Tenn.	Royal Grocery Co., Goldsboro, N. C.	July 18, '07
1776	-----do-----	-----do-----	Hunter & Dunn, Raleigh, N. C.	April 24, '07
1571	-----do-----	-----do-----	Wilson Grocery Co., Wilson, N. C.	Nov. 18, '06
1570	-----do-----	-----do-----	The Patterson Co., Greensboro, N. C.	Dec. 7, '06
1599	-----do-----	Jefferson Milling Co., Charleston, West Va.	O. P. Hay, Raleigh, N. C.	-----
1781	-----do-----	Tri-State Milling Co., Nashville, Tenn.	F. M. Carlton, Durham, N. C.	April 27, '07

TION OF BRANS.—CONTINUED.

Laboratory Number. ^a	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1521	1.40	100	15.50	3.50	9.00	-----	-----	3.51	9.30	-----	Wheat product.
1419	-----	-----	-----	-----	-----	-----	15.37	3.46	6.60	-----	do.
1535	-----	-----	-----	-----	-----	-----	16.25	3.65	9.63	5.53	do.
1542	1.25	100	14.50	4.00	9.50	-----	15.62	3.92	7.13	6.10	do.
1541	-----	100	14.50	4.00	9.50	-----	15.62	4.35	8.08	6.87	do.
1654	1.40	100	14.50	4.00	9.50	-----	15.50	3.61	8.73	6.73	do.
1739	1.40	100	14.50	4.00	9.50	-----	15.00	3.91	8.28	6.43	do.
1866	-----	100	14.50	4.00	9.50	-----	14.50	3.53	8.60	6.45	do.
1880	-----	-----	-----	-----	-----	-----	14.75	4.20	8.53	-----	do.
1760	-----	-----	-----	-----	-----	-----	15.12	3.78	8.48	6.73	do.
1701	-----	-----	-----	-----	-----	-----	16.75	3.90	8.65	-----	do.
1883	-----	-----	-----	-----	-----	-----	14.25	4.18	9.68	-----	do.
1515	1.50	100	14.50	4.00	9.50	-----	15.37	3.05	8.50	5.84	do.
1547	-----	80	18.00	3.50	8.00	-----	-----	5.99	8.83	5.67	do.
1546	1.25	80	18.00	3.50	8.00	-----	-----	6.53	8.00	5.73	do.
1594	-----	-----	-----	-----	-----	-----	15.00	4.33	9.35	6.14	do.
1767	-----	-----	-----	-----	-----	-----	14.75	3.97	7.38	5.83	do.
1626	1.40	100	14.50	4.00	9.50	-----	14.37	3.83	10.10	7.70	do.
1670	-----	80	14.50	4.00	9.50	-----	15.50	4.32	8.63	6.80	do.
1900	-----	-----	-----	-----	-----	-----	14.69	3.87	9.80	-----	do.
1809	1.55	100	14.50	4.00	9.50	-----	13.00	3.92	11.20	7.25	do.
1634	-----	100	14.50	4.00	9.50	-----	15.12	3.65	5.38	4.99	do.
1556	1.35	100	14.50	4.00	9.50	-----	14.50	2.46	7.08	-----	do.
1555	1.45	100	14.50	4.00	9.50	-----	14.62	4.53	6.83	6.52	do.
1771	-----	100	14.50	4.00	9.50	-----	14.75	4.20	7.58	6.60	do.
1559	1.25	80	17.50	3.50	7.25	-----	15.25	4.05	8.63	6.63	do.
1560	-----	100	17.50	3.50	7.25	-----	15.25	4.54	6.10	7.27	do.
1436	-----	-----	-----	-----	-----	-----	15.25	3.85	9.26	-----	do.
1855	-----	-----	-----	-----	-----	-----	15.00	7.58	8.90	-----	do.
1814	1.65	100	14.00	5.00	9.50	-----	13.87	3.22	-----	6.30	Wheat bran.
1776	1.50	100	14.00	5.00	9.50	-----	13.62	-----	5.70	6.03	do.
1571	-----	100	14.00	5.00	9.50	-----	14.13	3.75	9.10	6.99	Wheat product.
1570	-----	100	14.00	5.00	9.50	-----	14.60	4.13	7.15	5.55	do.
1599	-----	-----	-----	-----	-----	-----	15.50	4.26	9.50	-----	do.
1781	1.25	80	14.93	3.61	7.83	-----	14.62	1.25	8.45	5.63	do.

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1782 Bran -----	-----do-----	-----do-----	W. B. Cooper, Wilmington, N. C.	Mar. 27, '07
1857 ----do-----	-----do-----	J. H. Walker & Co., Reidsville, N. C.	Harris & Hubbard, Reidsville, N. C.	Aug. 2, '07
1796 ----do-----	-----do-----	Washburn-Crosby Milling Co., Louisville, Ky.	Job. P. Wyatt & Bro., Raleigh, N. C.	July 11, '07
1861 ----do-----	-----do-----	Washburn-Crosby Co., Minneapolis, Minn.	G. C. Welsch, Mt. Airy, N. C.	Aug. 2, '07

DISCUSSION OF RESULTS.

Seventy-two (72) samples of bran were examined. Sixty-eight were pure wheat products. Four samples, numbers 1723, 1870, 1639 and 1815, were branded

MIXED BRANS.

Under this heading is grouped mixtures of wheat bran with other materials. As will be seen from a close inspection of the column marked "Ingredients," most of these "mixed brans" are composed of wheat bran and corn bran.

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1718 Mixed bran -----	-----do-----	Asheville Milling Co., Asheville, N. C.	John Pearson, Morganton, N. C.	April 10, '07
1719 ----do-----	-----do-----	-----do-----	E. F. Kirksey, Morganton, N. C.	April 10, '07
1464 ----do-----	-----do-----	Clyde Roller Mills, Clyde, N. C.	C. H. Wray, Waynesville, N. C.	Dec. 13, '06
1532 ----do-----	-----do-----	Hickory Milling Co., Hickory, N. C.	Carolina Feed Store, Raleigh, N. C.	Dec. 5, '06
1531 ----do-----	-----do-----	-----do-----	J. S. Sutzer & Son, Hickory, N. C.	Dec. 10, '06
1499 ----do-----	-----do-----	Mountain City Milling Co., Chattanooga, Tenn.	John H. Pearson, Morganton, N. C.	Dec. 11, '06
1614 ----do-----	-----do-----	-----do-----	J. Flem Johnson, Gastonia, N. C.	Jan. 10, '07
1618 ----do-----	-----do-----	-----do-----	A. E. Rankin & Co., Fayetteville, N. C.	Jan. 11, '07
1748 ----do-----	-----do-----	-----do-----	J. Flem Johnson, Gastonia, N. C.	April 5, '07
1749 ----do-----	-----do-----	-----do-----	R. C. Kennedy, Bessemer City, N. C.	April 5, '07
1750 ----do-----	-----do-----	-----do-----	West Hill Co., Mt. Airy, N. C.	April 18, '07
1619 ----do-----	-----do-----	-----do-----	A. E. Rankin & Co., Fayetteville, N. C.	Jan. 11, '07
1839 ----do-----	-----do-----	-----do-----	Asheville Grocery Co., Asheville, N. C.	-----

DISCUSSION OF RESULTS.

Thirteen (13) samples of mixed brans were examined. A close inspection of

TION OF BRANS.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1782	-----	100	14.93	3.61	7.83	-----	15.12	3.57	8.75	6.45	Wheat product.
1857	-----	100	16.87	4.48	8.82	-----	-----	-----	8.23	6.23	do.
1796	1.50	100	16.00	4.00	-----	-----	16.75	3.75	8.73	5.63	do.
1861	-----	100	15.00	4.00	8.50	-----	15.62	4.77	9.55	6.48	Wheat bran.

bran or wheat bran, but were mixtures of wheat bran and corn bran. Such mixtures, to comply with the feed law, must be branded mixed bran.

Eleven (11) samples of the pure wheat bran were below the standard of 14.50 per cent. protein.

They must bear a tax tag besides a guaranteed analysis.

Such mixtures as these should be bought according to the guarantee they bear, as this will give the true quality of the product.

A mixture of wheat bran and corn bran cannot be branded or sold as bran, but must be branded "Mixed Bran," and have a tax tag attached to every bag.

TION OF MIXED BRANS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1718	\$-----	50	13.00	3.00	9.50	-----	15.37	2.63	6.75	5.10	Wheat bran and corn bran.
1717	-----	80	13.00	3.00	9.50	-----	14.75	3.30	6.48	5.15	Wheat and corn bran.
1464	1.15	80	12.50	4.50	7.50	-----	-----	-----	-----	-----	Wheat bran and corn bran.
1532	-----	100	14.50	4.00	9.00	-----	16.30	7.25	6.05	3.98	do.
1531	-----	100	14.50	4.00	9.00	-----	14.75	3.82	7.80	4.73	do.
1499	-----	100	12.50	3.50	8.50	-----	13.75	4.88	8.85	6.00	do.
1614	-----	80	12.50	3.50	8.50	-----	13.87	4.94	4.95	3.90	do.
1618	1.35	100	12.50	3.50	8.50	-----	13.12	4.10	7.37	4.90	Wheat bran and corn.
1748	-----	80	12.50	3.50	8.50	-----	12.37	2.98	7.63	5.03	Wheat bran and corn bran.
1749	1.50	80	12.50	3.50	8.50	-----	13.63	2.33	7.58	5.30	do.
1750	-----	100	12.50	3.50	8.50	-----	14.00	3.63	8.78	5.58	do.
1619	1.35	100	12.50	3.50	8.50	-----	13.00	1.70	7.85	4.67	do.
1899	-----	80	12.50	3.50	8.50	-----	13.00	3.92	7.50	5.47	do.

the above table will reveal the true quality of these feeds.

WHEAT MIDLINGS AND SHORTS.

The terms "middlings" and "shorts" are frequently used interchangeably. Some of the middlings have been found to be made up of re-ground bran, occasionally mixed with other products. Middlings are rich in protein and

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1719 Shorts-----		Akin-Erskine Milling Co., Evansville, Ind.	Cannon & Fetzer, Concord, N. C.	Apr. 20, '07
1450 Middlings-----		Asheville Milling Co., Ashe- ville, N. C.	S. H. Miller, Asheville, N. C.	Dec. 14, '06
1716 ----do-----		-----do-----	S. K. Breeding, Henderson- ville, N. C.	Apr. 13, '07
1715 ----do-----		-----do-----	John H. Jenkins, Asheville, N. C.	Apr. 11, '07
1453 ----do--(Badger Red Dog)		Badger-Crittenden Milling Co., Milwaukee, Wis.	L. R. Dixon, Reidsville, N. C.	Dec. 6, '06
1470 Middlings-----		H. C. Cole Milling Co., Chester, Ill.	Standard Feed & Seed Co., Winston, N. C.	Dec. 21, '06
1471 ----do-----		-----do-----	Hutcherson Bros., Reids- ville, N. C.	Dec. 6, '06
1482 Red Dog Flour (Superb)		Eagle Roller Mill Co., New Ulm, Minn.	The Patterson Co., Greens- boro, N. C.	Dec. 7, '06
1676 White Middlings-----		C. A. Gambriel Manufactur- ing Co., Baltimore, Md.	Wells Grocery Co., Wilson, N. C.	Mar. 20, '07
1834 ----do-----		-----do-----	Howard-Williams & Co., Wilson, N. C.	July 24, '07
1833 ----do-----		-----do-----	Wiggins Grocery Co., Wil- son, N. C.	July 24, '07
1494 Shorts-----		Greensboro Roller Mills, Greensboro, N. C.	Coe Bros., Greensboro, N. C.	Dec. 6, '06
1530 Shorts-----		Hickory Milling Co., Hick- ory, N. C.	McComb Bros. Hickory, N. C.	Dec. 10, '06
1600 Middlings-----		Jefferson Milling Co. Charles- ton, W. Va.	O. P. Hay, Raleigh, N. C.	-----
1420 Shorts-----		Julian Milling Co., Julian, N. C.	Sent in by mill-----	-----
1743 Middlings-----		Lexington Roller Mills Co., Lexington, Ky.	Parker Bros. Hay and Grain Co., High Point, N. C.	April 3, '07
1653 ----do-----		-----do-----	Fonville-Lamb Co., Golds- boro, N. C.	Mar. 18, '07
1612 Shorts-----		Liberty Mills, Nashville, Tenn.	W. M. Saunders, Smithfie d, N. C.	Jan. 10, '07
1655 ----do-----		-----do-----	Best & Thompson, Goldsboro, N. C.	Mar. 18, '07
1741 ----do-----		-----do-----	H. C. Watson, Rockingham, N. C.	Mar. 30, '07
1865 ----do-----		-----do-----	Cannon & Fetzer, Concord, N. C.	Aug 6, '07
1540 ----do-----		-----do-----	S. H. Miller, Asheville, N. C.	Dec. 14, '06
1620 Standard Middlings (Go-Far).		New Prague Flouring Mill Co., New Prague Minn.	Austin Stephens & Co., Smithfield, N. C.	Jan. 10, '07
1621 ----do-----		-----do-----	Cotter Underwood Co., Smithfield, N. C.	Jan. 10, '07
1589 Middlings-----		The Northwestern Consoli- dated Milling Co., Minneap- olis, Minn.	Hales & Edwards, Rocky Mount, N. C.	Nov. 19, '06
1566 Standard Middlings-----		Ohio Valley Mills, Louis- ville, Ky.	Hale & Edwards, Rocky Mount, N. C.	Nov. 19, '06
1700 Middlings-----		Page Milling Co., Luray, Va.	Sent in by mill-----	April 6, '07
1884 Shorts (Fancy)-----		Phoenix Flour Mills, Evans- ville, Ind.	Sent in by mill-----	-----
1762 Middlings (Red Dog)-----		Piedmont Mills, Lynchburg, Va.	F. M. Poore, Mount Airy, N. C.	April 18, '07
1761 ----do-----		-----do-----	Crowder & Rand, Raleigh, N. C.	April 24, '07
1514 ----do-----		-----do-----	Standard Feed and Seed Co. Winston, N. C.	Dec. 21, '06

low in fiber, and for this reason are very excellent feed for hogs. The name middlings or shorts indicate that the feed is an all-wheat product, but sometimes they are mixed with other substances, and when they are mixed their feeding value, in most cases, is reduced.

OF MIDLINGS AND SHOTS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1719	1.50	100	16.36	4.50	3.90	-----	17.75	5.35	4.13	3.55	Wheat product.
1450	-----	80	16.00	4.44	3.43	-----	13.75	4.43	2.80	2.58	do.
1716	1.35	80	16.00	4.44	3.43	-----	13.75	3.08	3.08	2.15	do.
1715	1.25	80	14.00	4.44	3.49	-----	15.44	5.09	2.88	2.30	do.
1458	1.65	100	18.00	4.00	-----	-----	16.00	3.54	1.53	2.25	do.
1470	1.60	100	16.00	4.00	6.00	-----	18.12	5.20	3.78	3.95	do.
1471	1.65	100	16.00	4.00	6.00	-----	17.68	5.15	-----	3.00	do.
1482	-----	100	18.57	5.62	-----	-----	18.50	4.51	2.65	3.37	do.
1676	1.40	80	16.85	4.40	3.00	-----	18.75	5.37	3.90	3.65	do.
1834	-----	100	16.85	4.40	3.00	-----	17.87	4.99	2.90	3.22	do.
1833	-----	100	16.85	4.40	3.00	-----	17.87	5.83	4.15	5.86	do.
1494	1.65	100	15.00	4.00	6.00	-----	17.62	4.97	3.83	3.48	do.
1530	1.65	100	14.75	2.60	2.75	-----	18.50	6.25	2.91	3.02	do.
1600	-----	-----	-----	-----	-----	-----	16.87	4.62	6.00	-----	do.
1420	-----	-----	-----	-----	-----	-----	13.37	1.93	6.30	.95	do.
1743	1.50	100	15.59	4.77	6.25	-----	16.50	3.51	4.65	3.38	do.
1653	-----	100	15.59	4.77	6.25	-----	15.75	4.15	5.48	2.06	do.
1612	1.60	100	16.00	4.00	6.42	-----	15.37	4.53	5.53	4.18	do.
1655	-----	100	16.00	4.00	6.42	-----	16.62	4.12	5.25	4.38	do.
1741	1.50	100	16.00	4.00	6.42	-----	17.50	5.88	5.85	5.03	do.
1865	-----	100	16.00	4.00	6.42	-----	16.12	5.04	5.68	4.70	do.
1540	1.35	100	16.00	4.00	6.42	-----	16.37	4.36	5.55	4.53	do.
1620	1.60	100	16.00	4.75	-----	-----	17.12	6.20	4.95	3.86	do.
1621	1.60	100	16.00	4.75	-----	-----	17.87	5.85	6.03	5.14	do.
1589	-----	100	16.75	5.00	8.30	-----	16.00	5.18	8.50	4.58	do.
1566	-----	100	16.00	4.75	7.25	-----	16.25	5.93	9.05	5.26	do.
1700	-----	-----	-----	-----	-----	-----	15.00	3.16	3.57	-----	do.
1884	-----	-----	-----	-----	-----	-----	16.50	4.62	4.88	-----	do.
1762	1.70	100	15.75	4.07	1.77	-----	16.12	4.09	2.03	2.52	do.
1761	1.50	100	17.75	4.07	1.77	-----	16.87	3.10	2.28	5.72	do.
1514	1.50	100	17.75	4.07	1.77	-----	16.50	4.14	1.78	2.02	do.

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1864	Daisy Flour (Pillsbury XX).	Pillsbury Milling Co., Minneapolis, Minn.	Glenn Feed Co., Winston, N. C.	Feb. 5, '07
1862	do	do	H. Schaffer, Mount Airy, N. C.	Aug. 2, '07
1863	do	do	G. C. Welsch, Mount Airy, N. C.	Aug. 2, '07
1859	Pillsbury (B) Middlings	do	Glenn Feed Co., Winston, N. C.	Aug. 5, '07
1766	Middlings	do	W. T. Tyson, Sanford, N. C.	April 2, '07
1765	Pillsbury (B) Middlings	do	Jonesboro, N. C.	April 2, '07
1513	Pillsbury XX Daisy Middlings.	do	Hutchison Bros., Reidsville, N. C.	Dec. 6, '06
1764	do	do	Davis & Hollingsworth, Mount Airy, N. C.	Apr. 19, '07
1680	Pillsbury Middlings	do	Matthews, Weeks & Co., Rocky Mount, N. C.	Mar. 20, '07
1624	do	do	Austin Stephens Co., Smithfield, N. C.	Jan. 10, '07
1879	Red Dog	James Quick Milling Co., Minneapolis, Ind.	Hutchison Bros., Reidsville, N. C.	Aug. 2, '07
1768	Shorts	Read Bros., Morristown, Tenn.	J. L. Smathers, Murphy, N. C.	Apr. 12, '07
1593	do	do	Sent in by mill	
1549	do	do	Forney & Co., Morganton, N. C.	Dec. 11, '06
1548	do	do	King & Marshall, Hendersonville, N. C.	Dec. 14, '06
1769	Middlings	The Riverton Mills Co., Riverton, Va.	H. Schaffer, Mt. Airy, N. C.	Apr. 19, '07
1553	Middlings (Ben Hur Flour.)	Royal Milling Co.	Matthews, Weeks & Co., Rocky Mount, N. C.	Nov. 19, '06
1892	Shorts	Star Mills, Nashville, Tenn.	Siegler & Co., Asheville, N. C.	Aug. 26, '07
1772	do	do	Asheville Grocery Co., Asheville, N. C.	Apr. 11, '07
1543	do	do	do	Dec. 14, '06
1633	do	do	J. F. McNair, Laurinburg, N. C.	Jan. 12, '07
1632	do	do	R. E. Lee, Laurinburg, N. C.	Jan. 12, '07
1685	Middlings	Suffolk Feed & Fuel Co., Suffolk, Va.	Hoffman Bros., Scotland Neck, N. C.	Mar. 21, '07
1779	do	J. A. Tate, Greensboro, N. C.	J. P. Wyatt & Son, Raleigh, N. C.	Apr. 24, '07
1858	Red Dog Flour (Superb)	J. H. Walker & Co., Reidsville, N. C.	Harris Hubbard, Reidsville, N. C.	Aug. 2, '07
1860	Flour Middlings (Adrian)	Washburn-Crosby Co., Minneapolis, Minn.	P. R. Lamb & Co., Winston, N. C.	Aug. 5, '07
1576	Shorts	Washburn-Crosby Co., Louisville, Ky.	Tomlinson, Bynum & Co., Winston, N. C.	Nov. 18, '07
1579	Middlings (Flour)	do	Seaboard Feed & Produce Co., Henderson, N. C.	Nov. 24, '06
1578	Middlings (Standard)	do	Burrus & Coleman, Henderson, N. C.	Nov. 24, '06
1577	Pillsbury (B) Middlings	Washburn-Crosby Co., Minneapolis, Minn.	Matthews, Weeks & Co., Rocky Mount, N. C.	Nov. 19, '06
1631	Shorts	White Star Mills, Staunton, Va.	H. W. Little & Co., Wadesboro, N. C.	Jan. 14, '07
1438	Middlings	do	Sent in by mill	Nov. 26, '06
1582	do	do	E. A. Kelly & Co., Henderson, N. C.	Nov. 24, '06

DISCUSSION OF RESULTS.

Sixty-three (63) samples of middlings were examined and all were found to

MIDDLINGS AND SHORTS.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1864	\$-----	140	16.00	4.50	-----	-----	18.12	4.61	2.45	3.14	Wheat product.
1862	-----	140	16.00	4.50	-----	-----	17.62	4.20	2.55	3.00	do.
1863	-----	140	16.00	4.50	-----	-----	16.00	4.38	2.25	3.25	do.
1859	-----	-----	14.00	4.50	-----	-----	16.12	5.44	7.50	5.21	do.
1766	1.65	100	14.00	4.50	-----	-----	12.75	6.04	10.23	4.83	do.
1765	-----	-----	-----	-----	-----	-----	14.87	5.33	9.80	5.18	do.
1513	1.70	100	16.00	4.50	-----	-----	18.50	-----	2.28	-----	do.
1764	2.20	140	16.00	4.50	-----	-----	17.12	4.52	2.50	5.78	do.
1680	1.50	100	14.00	4.50	-----	-----	16.12	4.89	8.75	5.37	do.
1624	-----	100	16.00	5.25	-----	-----	17.25	4.73	7.80	5.05	do.
1879	-----	100	16.50	4.50	-----	-----	14.87	2.15	1.58	2.00	do.
1768	1.40	80	13.50	4.50	4.50	-----	16.12	5.19	4.00	3.58	do.
1593	-----	-----	-----	-----	-----	-----	-----	3.20	5.10	4.31	do.
1549	1.45	80	13.50	4.50	4.50	-----	17.62	6.73	4.55	4.00	do.
1548	1.35	80	13.50	4.50	4.50	-----	16.87	7.23	4.23	3.60	do.
1769	1.50	100	16.35	3.96	4.42	-----	16.12	3.31	3.94	3.49	do.
1553	-----	100	18.00	5.00	6.00	-----	15.75	5.35	5.48	4.55	do.
1892	-----	100	16.00	4.00	6.42	-----	17.50	5.45	5.90	4.65	do.
1772	-----	80	16.00	4.00	6.42	-----	17.00	4.37	4.75	4.85	do.
1543	-----	100	16.00	4.00	6.42	-----	15.87	3.98	5.15	4.58	do.
1633	-----	100	16.00	4.00	6.42	-----	17.62	5.08	4.25	3.92	do.
1632	1.60	100	16.00	4.00	6.42	-----	16.75	5.25	7.58	5.35	do.
1685	1.50	-----	16.00	4.00	-----	-----	17.37	5.53	6.78	4.77	do.
1779	-----	100	15.44	3.44	2.77	-----	12.47	1.79	1.20	1.11	do.
1858	-----	100	18.57	5.52	-----	-----	16.75	5.18	2.35	2.85	do.
1860	-----	140	20.00	4.50	3.00	-----	18.50	4.95	2.65	3.38	do.
1576	-----	-----	-----	-----	-----	-----	17.12	3.73	4.35	4.20	do.
1579	1.65	100	18.00	5.00	5.00	-----	19.12	5.32	4.03	3.90	do.
1578	-----	-----	17.00	4.00	8.00	-----	15.75	4.95	8.40	5.15	do.
1577	-----	100	14.00	4.50	-----	-----	16.50	5.18	8.40	5.32	do.
1631	1.50	100	14.50	4.00	8.00	-----	16.25	5.03	6.48	5.10	do.
1438	-----	-----	-----	-----	-----	-----	14.87	3.55	1.46	-----	do.
1582	1.65	100	15.00	4.00	6.00	-----	15.50	3.81	2.18	2.24	do.

be pure wheat products.

Seven (7) are below the standard of 15.00 per cent. protein.

BRAN AND SHORTS.

When a feed is marked "Bran and Shorts" it is supposed to be made up of

RESULTS OF THE EXAMINATIONS.

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1709	Bran and shorts-----	Atlanta Milling Co., Atlanta, Ga.	Chambers & Moody, Charlotte, N. C.	Apr. 4, '07
1707	----do-----	----do-----	Farmers Implement Co., North Wilkesboro, N. C.	Apr. 18, '07
1787	----do-----	Home Milling Co., Lenoir, N. C.	Sent in by mill-----	Apr. 5, '07
1738	----do-----	J. Lee Koiner, Charlotte, N. C.	W. H. Jenkins, Gastonia, N. C.	Apr. 5, '07
1545	----do-----	Lexington Roller Mills, Lexington, Va.	Kluttz & Rendleman, Salisbury, N. C.	Dec. 9, '06
1745	----do-----	----do-----	W. H. Moffett, Lexington, N. C.	Apr. 17, '07
1601	----do-----	Marshall Milling Co., Marshall, N. C.	Sent in by mill-----	Feb. 8, '07
1501	----do-----	----do-----	J. B. Ingel, Asheville, N. C.	Dec. 14, '06
1502	----do-----	----do-----	A. Ficker, Hendersonville, N. C.	Dec. 14, '06
1505	----do-----	Moore Milling Co., Hickory, N. C.	Moore Milling Co., Hickory, N. C.	Dec. 10, '06
1613	----do-----	----do-----	W. H. Jenkins, Gastonia, N. C.	Jan. 16, '07
1587	----do-----	Newport Milling Co., Newport, Tenn.	Burckmeyer & Bro., Hendersonville, N. C.	-----
1586	----do-----	----do-----	I. Lippman, Salisbury, N. C.	Dec. 19, '06
1896	----do-----	----do-----	Asheville Grocery Co., Asheville, N. C.	-----
1786	----do-----	----do-----	O. M. Boyd & Co., Gastonia, N. C.	Apr. 5, '07
1785	----do-----	----do-----	Max Moses, Salisbury, N. C.	Apr. 3, '07
1784	----do-----	----do-----	I. Lippman, Salisbury, N. C.	Apr. 3, '07
1519	----do-----	Phoenix Manufacturing Co., Hickory, N. C.	McComb Brothers, Hickory, N. C.	Dec. 10, '06
1435	----do-----	Statesville Flour Mills, Statesville, N. C.	Sent in by mill-----	Nov. 26, '06
1562	----do-----	----do-----	B. J. Kimball, Statesville, N. C.	Dec. 10, '06
1561	----do-----	----do-----	Forney & Co., Morganton, N. C.	Dec. 14, '06

DISCUSSION OF RESULTS.

Nineteen (19) samples of bran and shorts were examined, and all were found

pure bran and shorts run together. It cannot be marked "Bran and Shorts" if it contains anything except pure wheat products.

NATION OF BRAN AND SHORTS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1709	\$-----	80	15.56	4.80	7.07	-----	14.13	3.80	5.38	4.37	Wheat product.
1707	-----	100	15.56	4.80	7.07	-----	15.37	2.68	6.03	4.10	do.
1787	-----	-----	-----	-----	-----	-----	17.25	5.47	5.82	-----	do.
1738	1.40	80	16.58	4.99	7.53	-----	16.37	4.50	6.40	10.37	do.
1545	1.60	100	18.25	4.86	6.47	-----	16.62	4.56	4.78	5.00	do.
1745	1.50	100	18.25	4.86	6.47	-----	14.25	3.59	4.98	3.57	do.
1601	-----	-----	-----	-----	-----	-----	16.12	4.06	9.50	-----	do.
1501	-----	80	-----	-----	-----	-----	15.62	3.75	4.65	4.75	do.
1502	-----	-----	-----	-----	-----	-----	15.12	2.89	3.98	3.45	Wheat product mostly bran.
1505	-----	80	14.50	4.00	8.00	-----	16.12	4.42	4.80	4.23	Wheat product.
1613	1.35	80	14.50	4.00	8.00	-----	17.25	3.65	6.08	4.79	do.
1587	1.20	80	14.50	4.00	8.00	-----	15.62	6.39	6.85	4.36	do.
1586	-----	-----	14.50	4.00	8.00	-----	16.62	4.30	7.35	5.08	do.
1896	-----	80	14.50	4.00	8.00	-----	14.75	2.80	5.90	4.30	do.
1786	-----	80	14.50	4.00	8.00	-----	14.86	4.25	5.60	4.60	Wheat bran and corn bran.
1785	1.12	80	14.50	4.00	8.00	-----	14.87	5.99	5.40	3.98	do.
1784	1.12	80	14.50	4.00	8.00	-----	14.50	3.75	5.25	4.17	do.
1519	1.50	100	14.87	5.11	6.41	-----	16.37	3.85	5.43	4.60	Wheat product.
1435	-----	-----	-----	-----	-----	-----	15.75	3.86	5.99	-----	do.
1562	1.40	80	17.75	3.50	6.75	-----	18.25	3.91	5.85	4.50	do.
1561	1.40	80	15.75	3.50	6.75	-----	18.00	4.35	6.75	5.12	do.

to be pure wheat products.

Two (2) samples were found below the standard of 14.50 per cent. protein.

BROWN SHORTS.

This Department rules that when a feed is branded "Brown Shorts" it must be an entire wheat product.

BROWN

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1644	Brown shorts-----	Atlanta Milling Co., Atlanta, Ga.	Sent in by mill-----	Feb. 22, '07
1708	---do-----	---do-----	Chambers & Moody, Charlotte, N. C.	Apr. 4, '07
1800	---do-----	Riverside Milling and Power Co., Cartersville, Ga.	Carolina Feed Store, Raleigh, N. C.	July 11, '07
1888	---do-----	---do-----	Chambers & Moody, Charlotte, N. C.	Aug. 22, '07

DISCUSSION OF RESULTS.

Four (4) samples of feed branded "Brown Shorts" were examined. Two samples, numbers 1644 and 1708, were pure wheat products. Samples 1800 and 1888 were mixtures of wheat and corn products.

SHIPSTUFF.

This is a name that applies to a mixture of no definite composition. It generally indicates a finely ground product, which may be an all-wheat pro-

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1441	Shipstuff-----	Adams Grain & Provision Co., Charlotte, N. C.	Stemson Grocery Co., Statesville, N. C.	Dec. 10, '06
1607	---do-----	Ballard & Ballard, Louisville, Ky.	Hardison Co., Wadesboro, N. C.	Jan. 14, '07
1688	---do-----	---do-----	F. V. Johnston, Greenville, N. C.	Mar. 22, '07
1722	---do-----	---do-----	Best & Newton, Hickory, N. C.	Apr. 10, '07
1699	---do-----	S. T. Beveridge & Co., Richmond, Va.	Tanner Bros., Rockingham, N. C.	-----
1641	---do-----	Cockade City Mills, Petersburg, Va.	Sent in by mill-----	-----
1812	---do-----	Dan Valley Mills, Danville, Va.	J. W. Isler & Co., Goldsboro, N. C.	July 18, '07
1729	---do-----	---do-----	Cooper & Gill, Statesville, N. C.	Apr. 9, '07
1479	---do-----	---do-----	Best & Thompson, Goldsboro, N. C.	Nov. 15, '06
1478	---do-----	---do-----	Cooper Bros., Statesville, N. C.	Dec. 10, '06
1596	---do-----	Douthit-Riddle Co., Danville, Va.	Sent in by mill-----	-----
1874	---do-----	Dunlop Mills, Richmond, Va.	G. W. Patterson, Concord, N. C.	Aug. 6, '07
1727	---do-----	---do-----	A. S. Cowan, Hamlet, N. C.	Apr. 2, '07
1726	---do-----	---do-----	W. G. Clark, Fayetteville, N. C.	Mar. 26, '07
1683	---do-----	---do-----	Hoffman & Bro., Scotland Neck, N. C.	Feb. 21, '07
1672	---do-----	---do-----	Wilson Grocery Co., Wilson, N. C.	Mar. 20, '07
1609	---do-----	---do-----	Cotter, Underwood Co., Smithfield, N. C.	Jan. 10, '07
1608	---do-----	---do-----	Crow & Bro., Monroe, N. C.	Jan. 15, '07

The sale of feeds which are mixtures of wheat products and other materials and branded "Brown Shorts," is prohibited, as it is a violation of the feed law.

SHORTS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1644 \$	-----	-----	-----	-----	-----	-----	16.50	5.25	5.57	-----	Wheat product.
1708	1.25	80	16.50	5.48	4.65	-----	16.12	4.58	4.60	3.68	do.
1800	-----	100	14.00	3.79	4.43	-----	13.87	-----	3.69	3.07	Wheat and corn product.
1888	-----	80	14.00	3.79	4.43	-----	11.87	4.05	4.65	3.47	do.

A feed cannot be branded "Brown Shorts" unless it is an entire wheat product.

Samples 1800 and 1888 are misbranded, and their sale as brown shorts has been prohibited in this State.

duct or a mixture with wheat product as the basis and such other substances as finely ground corn bran, rice chaff, corn-cobs, and oat hulls.

Shipstuff is so fine that the adulterants cannot be seen with the naked eye, and this fact is taken advantage of by unscrupulous manufacturers.

NATION OF SHIPSTUFF.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1441 \$	-----	100	15.00	4.00	6.00	-----	16.75	5.79	5.83	4.59	Wheat product.
1607	1.50	100	16.50	4.80	6.87	-----	17.12	4.25	6.38	4.68	do.
1688	1.50	100	16.50	4.80	6.87	-----	16.37	4.19	5.50	4.39	do.
1722	-----	100	16.50	4.80	6.87	-----	15.50	3.64	4.93	4.42	do.
1699	-----	-----	-----	-----	-----	-----	16.75	2.53	7.12	-----	do.
1641	-----	-----	-----	-----	-----	-----	13.93	3.89	7.65	-----	Wheat and corn product.
1812	1.60	100	15.00	4.00	6.00	-----	16.52	4.63	5.80	4.50	Wheat product.
1729	1.60	100	15.00	4.00	6.00	-----	16.25	4.75	5.10	4.38	do.
1479	1.50	100	15.00	4.00	6.00	-----	14.79	5.24	5.47	4.81	do.
1478	-----	100	15.00	4.00	6.00	-----	16.50	5.16	5.30	2.43	do.
1596	-----	-----	-----	-----	-----	-----	9.50	3.06	11.97	-----	do.
1874	-----	100	14.50	4.00	8.00	-----	14.50	4.25	6.48	4.80	do.
1727	-----	-----	14.50	4.00	8.00	-----	14.75	3.02	5.93	-----	do.
1726	1.50	100	14.50	4.00	8.00	-----	17.26	2.87	5.55	-----	do.
1683	1.50	100	14.50	4.00	8.00	-----	15.50	5.40	5.03	4.15	do.
1672	1.40	100	14.50	4.00	8.00	-----	16.62	3.73	5.50	4.75	do.
1609	1.60	100	14.50	4.00	8.00	-----	16.87	3.90	5.95	4.54	do.
1608	1.50	100	14.50	4.00	8.00	-----	16.50	4.32	5.55	4.31	do.

RESULTS OF THE EXAM

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1476	Shipstuff	Dunlop Mills, Richmond, Va.	W. R. Pickard, Greensboro, N. C.	
1477	do	do	Tomlinson, Bynum & Co., Wilson, N. C.	Nov. 18, '06
1686	do	S. G. Fairbanks & Co., Rich- mond, Va.	Edwards & Co., Scotland Neck, N. C.	Mar. 21, '07
1736	do	Harrisonburg Milling Co., Harrisonburg, Va.	W. T. S. Williams, Rocking- ham, N. C.	Mar. 30, '07
1528	do	High Point Milling Co., High Point, N. C.	J. W. Harris & Co., High Point, N. C.	Dec. 7, '06
1733	do	do	V. W. Idol & Co., High Point, N. C.	Apr. 2, '07
1592	do	do	D. H. McCullers, Clayton, N. C.	
1756	do	Mayo Milling Co., Richmond, Va.	W. T. Tyson, Sanford, N. C.	April 2, '07
1497	do	Mountain City Mill Co., Chat- tanooga, Tenn.	Len. H. Adams, Raleigh, N. C.	Dec. 5, '06
1496	do	do	McComb Bros., Hickory, N. C.	Dec. 10, '06
1498	do	do	S. K. Breeding, Henderson- ville, N. C.	Dec. 14, '06
1615	do	do	The J. A. Glenn Co., Gasto- nia, N. C.	Jan. 16, '07
1616	do	do	Armfield & Co., Fayetteville, N. C.	Jan. 11, '07
1617	do	do	A. E. Rankin & Co., Fayette- ville, N. C.	Jan. 11, '07
1751	do	do	L. H. Caldwell, Lumberton, N. C.	Mar. 29, '07
1752	do	do	Whitlock & Morrison, Rock- ingham, N. C.	Mar. 1, '07
1753	do	do	John H. Jenkins, Asheville, N. C.	April 11, '07
1754	do	do	McCaskill Grocery Co., Max- ton, N. C.	Mar. 27, '07
1817	do	do	W. P. Neal, Louisburg, N. C.	
1882	do	do	do	
1517	do	Piedmont Mills, Lynchburg, Va.	Chambers & Moody, Char- lotte, N. C.	Dec. --, '07
1516	do	do	Phillips & Penny, Raleigh, N. C.	Dec. 5, '06
1622	do	do	J. Flem. Johnson, Gastonia, N. C.	Jan. 16, '07
1623	do	do	Leak & Marshall, Wades- boro, N. C.	Jan. 14, '07
1763	do	do	J. T. Rogers & Co., Durham, N. C.	April 27, '07
1518	do	J. L. Pleasants & Co., Lynch- burg, Va.	Harris & Hubbard, Reids- ville, N. C.	Dec. 6, '06
1565	do	J. Allen Smith & Co., Knox- ville, Tenn.	M. M. Sheppard, Henderson- ville, N. C.	Dec. 14, '06
1564	do	do	Hales & Edwards, Rocky Mount, N. C.	Nov. 19, '06
1625	do	do	J. Shute & Sons, Monroe, N. C.	Jan. 15, '07
1627	do	do	Hardison Co., Wadesboro, N. C.	Jan. 14, '07
1628	do	do	Adams Grain and Provision Co., Maxton, N. C.	Jan. 12, '07
1629	do	do	Nimocks & Co., Fayetteville, N. C.	Jan. 11, '07
1630	do	do	A. E. Rankin & Co., Fayette- ville, N. C.	Jan. 11, '07
1678	do	do	Hales & Edwards, Rocky Mount, N. C.	Mar. 20, '07
1773	do	do	L. C. McDuffie, Hope Mills, N. C.	Mar. 25, '07
1806	do	do	Nimocks & Co., Fayetteville, N. C.	July 17, '07

NATION OF SHIPSTUFF.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1476	\$ 1.50	100	14.50	4.00	8.00	-----	17.00	5.12	5.63	4.66	Wheat product.
1477	-----	-----	14.50	4.00	8.00	-----	17.25	5.14	5.80	5.40	do.
1686	-----	-----	-----	-----	-----	-----	15.87	4.75	5.43	4.17	do.
1736	1.50	100	16.50	4.26	5.94	-----	16.50	4.38	3.90	3.37	do.
1528	1.25	80	15.12	4.45	4.25	-----	15.62	5.55	5.65	4.35	do.
1733	-----	100	15.12	4.45	4.25	-----	15.37	3.20	4.25	3.18	do.
1592	-----	-----	-----	-----	-----	-----	14.25	3.62	5.80	3.48	do.
1756	1.45	100	15.62	3.95	6.00	-----	15.50	4.95	5.38	4.24	do.
1497	1.40	100	12.50	3.50	8.50	-----	15.12	4.30	5.33	4.57	Wheat and corn product.
1496	1.65	100	12.50	3.50	8.50	-----	13.12	3.96	2.73	2.57	do.
1498	-----	100	12.50	3.50	8.50	-----	14.00	4.01	2.40	2.65	do.
1615	1.35	80	12.50	3.50	8.50	-----	13.25	3.23	2.45	2.52	do.
1616	1.30	100	12.50	3.50	8.50	-----	14.25	4.43	4.25	3.80	do.
1617	1.45	100	12.50	3.50	8.50	-----	12.75	3.43	2.80	3.22	do.
1751	1.50	100	12.50	3.50	8.50	-----	15.12	3.97	4.90	4.10	do.
1752	1.50	100	12.50	3.50	8.50	-----	14.87	4.80	4.23	3.56	do.
1753	1.45	100	12.50	3.50	8.50	-----	13.87	5.60	4.20	3.53	do.
1754	1.65	100	12.50	3.50	8.50	-----	13.87	4.49	3.98	-----	do.
1817	-----	-----	-----	-----	-----	-----	10.44	6.03	4.25	-----	
1882	-----	-----	-----	-----	-----	-----	10.50	3.02	3.25	-----	
1517	-----	100	15.00	4.00	6.00	-----	16.62	4.06	6.30	4.70	Wheat product.
1516	1.40	100	15.00	4.00	6.00	-----	15.75	-----	-----	4.65	Wheat product (trashy).
1622	-----	100	15.00	4.00	8.00	-----	16.06	4.38	5.83	4.74	Wheat product.
1623	1.50	100	15.00	4.00	6.00	-----	14.87	4.08	5.28	4.57	do.
1763	-----	100	15.00	4.00	6.00	-----	16.00	4.48	6.33	4.42	do.
1518	-----	100	15.00	3.00	-----	-----	15.25	2.17	5.28	4.65	do.
1565	1.50	100	15.00	5.00	7.00	-----	15.87	5.35	5.73	4.82	do.
1564	-----	100	15.00	5.00	7.00	-----	16.00	4.65	6.70	4.78	do.
1625	1.40	100	15.00	5.00	7.00	-----	15.75	4.37	5.78	4.32	Wheat and corn product.
1627	1.50	100	15.00	5.00	7.00	-----	16.00	4.33	6.00	4.65	do.
1628	1.40	100	15.00	5.00	7.00	-----	16.10	4.38	6.35	5.35	do.
1629	1.35	100	15.00	5.00	7.00	-----	11.88	4.38	4.05	3.10	do.
1630	1.45	100	15.00	5.00	7.00	-----	14.77	4.95	5.95	4.47	do.
1678	1.50	100	15.00	5.00	7.00	-----	15.12	4.73	6.43	4.40	do.
1773	1.50	100	15.00	5.00	7.00	-----	14.37	3.29	5.48	1.36	do.
1806	1.60	100	15.00	5.00	7.00	-----	15.50	3.68	6.18	4.50	do.

RESULTS OF THE EXAMIN

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1901	Shipstuff -----	J. Allen Smith & Co., Knoxville, Tenn.	Sent in by mill -----	
1434	Pure wheat shipstuff-----	Statesville Flour Mills, Statesville, N. C.	do -----	
1557	do -----	do -----	J. C. Turner & Son, Statesville, N. C.	Dec. 10, '06
1558	do -----	do -----	Davidson & Wolfe, Charlotte, N. C.	Dec. 17, '06
1569	Shipstuff -----	Tennessee Mill Co., Estill Springs, Tenn.	P. R. Lamb & Co., Winston, N. C.	Dec. 21, '06
1568	do -----	do -----	J. F. Jamison, Charlotte, N. C.	Dec. 17, '06
1635	do -----	do -----	Nimocks & Co., Fayetteville, N. C.	Jan. 11, '07
1777	do -----	do -----	Cannon & Fetzer Co., Concord, N. C.	April 3, '07
1778	do -----	do -----	Lackey Bros., Hamlet, N. C.	April 2, '07
1572	do -----	J. H. Walker & Co., Reidsville, N. C.	Harris & Hubbard, Reidsville, N. C.	Dec. 6, '06
1580	do -----	Wachovia Mills, Winston-Salem, N. C.	G. L. Dull & Co., Winston, N. C.	Dec. 21, '06

DISCUSSION OF RESULTS.

Sixty-five (65) samples of shipstuff were examined. Forty-six (46) were

OAT FEEDS AND CORN AND OAT FEEDS.

In the manufacture of oat products for human food the kernel of the oat is separated from the hull. Oat hulls, are in themselves low in food value, being very much like straw in this regard. Their value may be materially greater if broken kernels or small oats are ground in with them. Manufacturers of oat products are putting ground oat hulls on the market in many forms, such as Oat Feed, Oat Chops, Corn and Oat Feed, Purina Feed, Boss Corn and

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1442	Victor Corn and Oat Feed.	The American Cereal Co., Chicago, Ill.	G. L. Dull & Co., Winston, N. C.	Dec. 21, '06
1443	do -----	do -----	M. G. Brown, Edenton, N. C.	Nov. 23, '06
1444	do -----	do -----	Matthews Weeks & Co., Rocky Mount, N. C.	Nov. 19, '06
1445	do -----	do -----	The Worth Co., Wilmington, N. C.	Nov. 16, '06
1695	do -----	do -----	H. C. Privatt, Edenton, N. C.	Mar. 25, '07
1875	do -----	do -----	I. Lippman, Salisbury, N. C.	Aug. 5, '07
1663	do -----	do -----	Burrus & Gray Co., New Bern, N. C.	Mar. 19, '07
1838	Boss Chop Feed -----	The Great Western Cereal Co., Chicago, Ill.	do -----	July 19, '07
1694	do -----	do -----	M. G. Brown, Edenton, N. C.	Mar. 25, '07

NATION OF SHIPSTUFF.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1901	\$-----						14.75	4.19	5.78	-----	Wheat product.
1434							15.62	4.21	6.52	-----	do.
1557	1.40	80	17.50	2.50	6.75	-----	17.25	4.11	5.63	4.47	do.
1558	1.25	80	17.60	2.50	6.75	-----	15.50	4.26	6.15	3.70	do.
1569	1.50	100	16.00	4.00	5.00	-----	14.75	4.46	4.33	3.41	do.
1568	-----	50	16.00	4.00	5.00	-----	15.00	4.39	4.25	4.61	do.
1635	1.40	100	16.00	4.00	5.00	-----	16.75	5.29	5.20	5.12	do.
1777	-----	100	16.00	4.00	5.00	-----	16.25	5.08	4.30	1.62	do.
1778	1.65	100	16.00	4.00	5.00	-----	15.25	4.78	4.40	4.05	do.
1572	1.65	100	16.75	4.50	4.71	-----	15.69	4.70	3.75	3.05	
1580	1.60	100	9.00	4.00	4.00	-----	12.87	-----	1.20	1.17	

pure wheat products and nineteen (19) were mixtures of wheat and corn products.

Close inspection of the above table will reveal the merits of the different shipstuffs.

Oat Feed, Vim Oat Feed, Victor Corn and Oat Feed, Model Corn and Oat Feed, Quaker Dairy Feed, and others. The bulk of all these materials is ground oat hulls with admixture of ground corn and oat kernels. The feeding value of them is variable and they should never be bought except on a guaranteed composition, and then it should be remembered that the oat hulls are not as digestible as the kernel of oats or other grains.

The price paid for these feeds is, as a rule, far in excess of their feeding value when compared with wheat bran, middlings and cotton-seed meal.

OAT FEEDS AND CORN AND OAT FEEDS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1442	\$ 1.50	100	7.50	3.00	10	-----			12.27	3.61	Corn, oats and cat hulls.
1443	1.40	100	7.50	3.00	10	-----	8.50	5.57	11.95	3.70	do.
1444	1.00	-----	7.50	3.00	10	-----	7.87	2.34	12.67	3.50	do.
1445	-----	100	7.50	3.00	10	-----	8.47	4.15	12.25	4.02	do.
1695	-----	100	7.50	3.00	10	-----	7.50	2.53	10.65	3.47	Ground corn, oats and oat hulls.
1875	1.75	100	7.50	3.00	10	-----	9.13	2.63	11.70	3.63	Corn, oats and oat hulls.
1663	-----	100	7.50	3.00	10	-----	6.62	2.63	12.28	3.55	Corn, oats, mostly oat hulls.
1838	-----	-----	8.00	3.50	-----	-----	7.00	8.00	9.20	3.13	Corn, oats and oat hulls.
1694	1.40	100	8.50	3.50	-----	-----	9.50	4.53	9.40	4.34	Some ground corn and oats, but mostly oat hulls.

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1731	Boss Corn and Oat Feed.	The Great Western Cereal Co., Chicago, Ill.	I. Lippman, Salisbury, N. C.	Apr. 3, '07
1491	do	do	Kluttz & Rendleman, Salisbury, N. C.	Dec. 19, '06
1492	do	do	L. H. Adams, Raleigh, N. C.	Dec. 5, '06
1493	do	do	F. G. Paul & Bro., Washington, N. C.	Nov. 21, '06
1662	do	do	Burrus & Gray Co., New Bern, N. C.	Mar. 19, '07
1645	Purina Feed	Ralston Purina Co., St. Louis, Mo.	Sent in by mill	
1808	do	do	A. E. Rankin Co., Fayetteville, N. C.	July 17, '07
1584	Mixed Corn and Oat Feed	W. S. White & Co., Elizabeth City, N. C.	W. S. White & Co., Elizabeth City, N. C.	Nov. 26, '06
1697	do	do	do	Mar. 25, '07

DISCUSSION OF RESULTS.

Eighteen (18) samples of corn and oat feeds were examined.

These are low-grade feeds, as they contain less than 10.00 per cent. protein.

RICE FEEDS.

On preparing rice for human consumption the mills first remove the two outer layers and then polish the grain before it is ready for the market. Rice bran, rice polish and rice meal, which are known as rice feeds, are the by-products from the manufacture of rice for human consumption. Rice bran is the thin skin which lies next to the rice grain; rice polish is the by-product from polishing the rice grain after the bran has been removed; rice meal is a

RESULTS OF THE EXAMI

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1848	Rice Meal	Carolina Rice Mills, Goldsboro, N. C.	Royal Grocery Co., Goldsboro, N. C.	July 18, '07
1461	Extra Rice Meal	do	Howard Williams & Co., Wilson, N. C.	Nov. 18, '06
1463	Rice Meal	do	Hooker, Churchill & Co., Kinston, N. C.	Nov. 17, '06
1904	Rice Meal	do	R. B. Peters Grocery Co., Tarboro, N. C.	Oct. 3, '07
1846	Tar-Heel Meal	do	Rocky Mount, N. C.	July 25, '07
1724	Rice Meal	do	L. H. Adams, Raleigh, N. C.	Apr. 24, '07
1693	do	do	M. G. Brown, Edenton, N. C.	Mar. 25, '07
1677	Extra Rice Meal	do	Howard Williams & Co Wilson, N. C.	Mar. 20, '07
1673	do	do	Tomlinson & Co., Wilson, N. C.	Mar. 20, '07
1651	Rice Meal	do	Fonville, Lamb Co., Goldsboro, N. C.	Mar. 18, '07

OAT FEEDS AND CORN OAT FEEDS.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1731	—	—	8.50	3.50	—	—	8.12	3.50	10.88	4.95	Corn, oats, mostly oat hulls.
1491	1.60	100	9.00	4.00	11.00	—	8.50	4.32	8.45	3.58	do.
1492	1.35	100	9.00	4.00	11.00	—	8.63	4.16	10.54	4.62	do.
1493	1.40	100	8.50	3.50	—	—	8.75	3.65	10.80	4.07	do.
1662	—	100	8.50	3.50	—	—	9.13	4.10	9.08	4.43	do.
1645	—	—	—	—	—	—	13.12	5.74	7.60	3.40	Mostly corn, oats and barley.
1808	1.65	100	14.00	6.00	6.90	—	15.25	3.19	6.85	3.08	Corn, barley, oats.
1584	—	100	11.44	4.92	8.82	—	9.87	3.89	3.85	2.23	Ground corn and oats.
1697	1.40	100	11.44	4.92	8.82	—	8.75	3.68	2.85	2.07	Corn and oat product.

The true character of these feeds is shown by the results in the table above.

This class of feeds bears a guaranteed analysis, which should guide the consumer in purchasing.

mixture of rice bran and rice polish. Pure rice bran is seldom found in this State, as in the majority of cases it is mixed with rice hulls or chaff, and its feeding value is accordingly reduced. The polish is free from hulls and other substances and is about as good feed as corn meal, and can be fed profitably when purchased at the same price.

Rice feeds have a high fat content, and for this reason their keeping quality is rather poor.

NATION OF RICE FEEDS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1848	1.50	100	11.62	12.72	9.11	—	12.12	5.39	13.98	9.47	Rice Product.
1461	—	100	12.37	13.44	7.00	—	11.25	9.76	8.12	9.24	do.
1463	—	100	12.37	13.44	7.44	—	11.75	8.96	14.62	12.07	do.
1904	—	—	—	—	—	—	9.00	7.36	13.78	—	do.
1846	—	—	16.25	10.13	10.50	—	14.25	5.83	17.23	12.13	do.
1724	1.45	100	12.37	13.44	7.66	—	12.62	8.47	8.85	7.50	do.
1693	1.50	100	11.62	12.72	9.11	—	11.50	10.15	12.65	12.13	do.
1677	—	100	12.37	13.44	7.66	—	10.88	8.81	8.98	8.85	do.
1673	1.40	100	12.37	13.44	7.66	—	10.50	8.30	10.28	9.57	do.
1651	1.25	100	11.62	12.72	9.11	—	11.13	12.52	13.73	13.04	do.

RESULTS OF THE EXAMIN

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1650	Rice Meal -----	Carolina Rice Mills, Goldsboro, N. C.	J. W. Isler & Co., Goldsboro, N. C.	Mar. 18, '07
1459	----do -----	-----do-----	Len H. Adams, Raleigh, N. C.	Dec. 5, '06
1490	Empire Rice Meal -----	Robert Guerard, New Orleans, La.	Wilson Grocery Co., Wilson, N. C.	Nov. 17, '06
1790	Carolina Rice Meal -----	West Point Mill Co., Charleston, S. C.	Sent in by mill -----	-----
1847	----do -----	-----do-----	Hadley, Harris & Co., Wilson, N. C.	July 24, '07
1460	Rice Meal -----	Carolina Rice Mills, Goldsboro, N. C.	R. B. Peters Grocery Co., Tarboro, N. C.	Nov. 19, '06

DISCUSSION OF RESULTS.

Sixteen (16) samples of rice feed were examined. These feeds vary very

SACCHARINE (SUGAR) FEEDS.

Some of these feeds are mixtures of molasses and feeds rich in protein, and should be productive of good results, provided the mechanical condition is satisfactory and the price is not excessive.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1845	Sucrene Dairy Feed -----	American Milling Co., Chicago, Ill.	Best & Thompson, Goldsboro, N. C.	July 18, '07
1810	----do -----	-----do-----	Culbreth & Co., Fayetteville, N. C.	July 17, '07
1446	----do -----	-----do-----	Carolina Feed Store, Raleigh, N. C.	Dec. 5, '06
1447	----do -----	-----do-----	Morrison Produce & Provision Co., Statesville, N. C.	Dec. 10, '06
1807	----do -----	-----do-----	Nimocks & Co., Fayetteville, N. C.	July 17, '07
1714	----do -----	-----do-----	J. P. Wyatt & Son, Raleigh, N. C.	Apr. 24, '07
1713	----do -----	-----do-----	Adams Grain & Provision Co., Charlotte, N. C.	Apr. 4, '07
1711	----do -----	-----do-----	Cooper & Gill, Statesville, N. C.	Apr. 9, '07
1712	----do -----	-----do-----	Morrison Produce & Provision Co., Statesville, N. C.	Apr. 9, '07
1679	----do -----	-----do-----	Matthews, Weeks & Co., Rocky Mount, N. C.	Mar. 20, '07
1657	----do -----	-----do-----	Best & Thompson, Goldsboro, N. C.	Mar. 18, '07
1606	----do -----	-----do-----	Culbreth & Co., Fayetteville, N. C.	Jan. 11, '07
1603	----do -----	-----do-----	J. Flen Johnson, Gastonia, N. C.	Jan. 16, '07
1710	Sucrene Horse, Mule, and Ox Feed.	-----do-----	J. P. Wyatt & Son, Raleigh, N. C.	Apr. 24, '07
1811	----do -----	-----do-----	Culbreth & Co., Fayetteville, N. C.	July 17, '07

NATION OF RICE FEEDS.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients,
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1650	\$-----	80	11.62	12.72	9.11	-----	11.65	13.20	14.55	11.16	do.
1459	-----	100	12.75	13.44	7.05	-----	12.13	11.18	10.75	10.11	do.
1490	1.80	143	10.50	11.37	12.50	-----	11.37	12.97	11.08	12.40	do.
1790	-----	-----	-----	-----	-----	-----	11.00	7.02	7.57	-----	do.
1847	-----	100	11.15	9.25	7.50	-----	12.37	7.65	8.53	8.90	do.
1460	-----	100	12.37	13.44	7.66	-----	9.50	9.76	14.55	12.10	do.

much in composition and should be purchased according to the analysis they bear.

Molasses is a carbohydrate and can be fed in small quantities to cattle satisfactorily, but when mixed with rich protein substances can be used in large quantities with good results.

OF MOLASSES OR SUGAR FEEDS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1845	\$ 1.50	100	16.50	3.50	12.00	-----	16.75	6.12	8.95	6.06	Corn product, wheat product, oats, barley, malt sprouts, cotton-seed meal and molasses.
1810	1.40	100	16.50	3.50	12.00	-----	16.69	6.31	9.65	7.03	Corn, distillery product, cotton-seed meal, oats, molasses.
1446	-----	-----	16.50	3.50	12.00	-----	18.50	4.79	7.97	6.93	Corn, barley, cotton-seed meal, brewer's grains, oats, molasses.
1447	1.35	100	16.50	3.50	12.00	-----	18.00	7.12	9.25	7.13	Corn, barley, cotton-seed meal, brewer's grains, oats, molasses.
1807	-----	-----	16.50	3.50	12.00	-----	17.87	6.33	9.48	6.95	Corn, oats, distillery product, cotton-seed meal, molasses.
1714	-----	-----	16.50	3.50	12.00	-----	-----	6.43	9.55	7.98	Corn, barley, distillery product, oats, cotton-seed meal, molasses.
1713	-----	-----	16.50	3.50	12.00	-----	18.50	5.85	8.67	2.60	Corn, barley, cotton-seed meal, distillery product, oats, molasses.
1711	1.60	100	16.50	3.50	12.00	-----	17.00	5.70	9.78	7.05	Corn, oats, distillery product, cotton-seed meal and molasses.
1712	1.35	100	16.50	3.50	12.00	-----	17.12	6.03	8.78	7.38	Corn, oats, distillery product, cotton-seed meal and molasses.
1679	-----	100	16.50	3.50	12.00	-----	17.00	5.05	9.85	7.64	Corn, barley, cotton-seed meal, brewer's grains, oats, molasses.
1657	1.50	100	16.50	3.50	12.00	-----	17.37	5.09	10.04	7.00	Corn, barley, cotton-seed meal, brewer's grains, oats, molasses.
1606	1.35	100	16.50	3.50	12.00	-----	17.00	5.55	9.53	7.42	Corn, barley, cotton-seed meal, brewer's grains, oats, molasses.
1603	-----	100	16.50	3.50	12.00	-----	17.50	5.32	10.43	7.94	Corn, barley, cotton-seed meal, brewer's grains, oats, molasses.
1710	-----	100	13.50	3.50	12.00	-----	-----	3.93	10.30	7.27	Corn, oats, distillery products, cotton-seed meal, oat hulls, weed seeds and molasses.
1811	1.45	100	13.50	3.50	12.00	-----	10.94	4.77	10.10	6.74	Corn, oats, distillery product, molasses, weed seeds, cotton-seed meal and oat hulls.

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1844	Sucrene Horse, Mule, and Ox Feed.	American Milling Co., Chicago, Ill.	Best & Thompson, Goldsboro, N. C.	July 18, '07
1656	do	do	do	Mar. 18, '07
1605	do	do	Culbreth & Co., Fayetteville, N. C.	Jan. 11, '07
1746	Saccharine Dairy Feed.	Lewis Leonhardt & Co., Knoxville, Tenn.	Carolina Feed Store, Raleigh, N. C.	Apr. 24, '07
1536	do	do	King & Marshall, Hendersonville, N. C.	Dec. 14, '06
1537	do	do	Coe Bros., Greensboro, N. C.	Dec. 7, '06
1538	do	do	Asheville Grocery Co., Asheville, N. C.	Dec. 14, '06
1539	do	do	Carolina Feed Store, Raleigh, N. C.	Dec. 5, '06
1512	Muellers' Molasses Grains.	E. P. Mueller, Milwaukee, Wis.	J. Havens, Washington, N. C.	Nov. 21, '06
1506	do	do	J. R. & J. G. Moye, Greenville, N. C.	Nov. 20, '06
1511	do	S. T. Beveridge & Co., (brokers), Richmond, Va.	J. L. Cowan, Statesville, N. C.	Dec. 10, '06
1721	do	do	do	Apr. 9, '07
1687	do	City Hay & Grain Co., (brokers), Suffolk, Va.	J. R. & J. G. Moye, Greenville, N. C.	Mar. 22, '07
1510	do	E. P. Mueller (branch), Norfolk, Va.	Cramer Bros. Co., Winston, N. C.	Dec. 21, '06
1509	do	S. T. Beveridge & Co., Richmond, Va.	Genn Carroll Co., Concord, N. C.	Dec. 18, '06
1843	do	E. P. Mueller, Milwaukee, Wis.	Sutherland Co., Goldsboro, N. C.	July 18, '07
1886	do	do	Adams, Grain & Provision Co., Charlotte, N. C.	Aug. 22, '07
1803	do	do	W. A. Myatt, Raleigh, N. C.	July 11, '07
1666	do	do	Neuse Milling Co., Kinston, N. C.	Mar. 20, '07
1667	do	do	Edwards & Pegram, Kinston, N. C.	Mar. 20, '07
1649	do	do	J. W. Isler & Co., Goldsboro, N. C.	Mar. 18, '07
1508	do	do	Adams Grain & Provision Co., Charlotte, N. C.	Dec. 17, '06
1755	do	do	L. M. Foushee & Co., Jonesboro, N. C.	Apr. 2, '07
1507	do	do	Edwards & Pegram, Kinston, N. C.	Nov. 17, '07
1698	do	do	Adams Grain & Provision Co., Charlotte, N. C.	Apr. 6, '07

DISCUSSION OF RESULTS.

Thirty-nine (39) samples of molasses or sugar feeds were examined. The Sucrene Feeds are up to their guarantees and are good quality.

The samples of Saccharine Dairy Feed examined show this feed to be inferior and not up to its guaranteed composition. The samples of this feed

MOLASSES OR SUGAR FEEDS.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1844	\$ 1.50	100	13.50	3.50	12.00	-----	11.63	4.09	9.28	6.90	Cotton-seed meal, corn, oats, oat hulls, barley, weed seeds and molasses.
1656	1.50	100	13.50	3.50	12.00	-----	11.37	4.48	10.86	7.25	Cotton-seed meal, wheat and corn product, oat hulls, molasses, weed seeds.
1605	1.35	100	13.50	3.50	12.00	-----	12.12	4.14	11.13	7.28	Corn, oats, distillery product, molasses, oat hulls and cotton-seed meal, weed seeds.
1746	-----	100	17.00	4.00	-----	-----	-----	5.35	-----	4.70	Mostly distillery products and molasses, rice chaff and probably some ground corn and oats.
1536	1.35	100	17.00	4.00	-----	-----	12.25	4.18	12.40	6.75	Mostly distillery products and molasses, rice chaff and probably some ground corn and oats.
1537	1.35	100	17.00	4.00	-----	-----	13.25	3.66	20.75	11.07	Mostly distillery products and molasses, rice chaff and probably some ground corn and oats.
1538	-----	100	17.00	4.00	-----	-----	11.00	2.06	-----	11.82	Mostly distillery products and molasses, rice chaff and probably some ground corn and oats.
1539	-----	100	17.00	4.00	-----	-----	11.88	-----	16.07	-----	Mostly distillery products and molasses, rice chaff and probably some ground corn and oats.
1512	-----	-----	21.81	2.73	-----	-----	17.87	4.63	8.95	6.55	Mostly barley and molasses.
1506	-----	-----	21.81	2.73	-----	-----	18.62	3.63	9.83	6.70	Mostly barley and molasses.
1511	-----	-----	21.81	2.73	-----	-----	13.12	3.01	15.90	4.35	Some cracked corn, distillery products, barley and molasses.
1721	1.40	100	21.81	2.73	-----	-----	8.19	1.78	17.13	7.05	Mostly a distillery product and molasses.
1687	1.50	100	21.81	2.73	-----	-----	10.87	1.21	10.35	8.93	Mostly barley and molasses.
1510	1.30	100	21.81	2.73	-----	-----	12.25	2.52	12.43	-----	Mostly barley and molasses.
1509	1.50	100	21.81	2.73	-----	-----	20.25	2.77	10.40	6.12	Mostly barley and molasses.
1843	-----	100	19.81	2.73	-----	-----	8.81	4.83	3.10	1.60	Mostly a distillery product and molasses.
1886	-----	100	19.81	2.73	-----	-----	15.37	2.25	7.40	6.48	Corn, distillery products, molasses.
1803	1.35	100	21.81	2.73	-----	-----	15.25	1.37	10.90	10.85	Distillery products and molasses.
1666	-----	100	21.81	2.73	-----	-----	13.62	1.53	9.55	7.69	Mostly barley and molasses.
1667	1.50	100	21.81	2.73	-----	-----	9.38	2.22	19.15	5.07	Corn, oats, distillery product and molasses.
1649	-----	100	21.81	2.73	-----	-----	12.37	1.24	-----	7.78	Mostly barley and molasses.
1508	-----	100	21.81	2.73	-----	-----	10.12	2.33	13.10	-----	Barley, whole oats and molasses.
1755	1.60	100	21.81	2.73	-----	-----	9.00	1.77	19.33	6.17	Mostly a distillery product and molasses.
1507	1.50	100	21.81	2.73	-----	-----	11.13	3.04	16.67	4.15	Mostly barley and molasses.
1698	-----	100	2.81	2.73	-----	-----	11.25	4.59	7.35	-----	Cracked corn, barley and molasses.

examined contained rice chaff, which is an adulteration and prohibited by the feed law.

Seventeen (17) samples of Mueller's Molasses Grains were examined and a close inspection of the analyses of these samples will reveal their true quality. With a few exceptions, they are not up to their guaranteed composition, and different samples are not made up of the same materials.

DRIED BEET PULP.

This is by-product from the manufacture of beet sugar from the sugar beet.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1798	Dried Beet Pulp -----	-----	Carolina Feed Store, Raleigh, N. C.	July 11, '07
1835	----do -----	Michigan Sugar Co., Bay City, Mich.	Wilson Grocery Co., Wilson,	July 11, '07
1452	----do -----	Bay City, Michigan, Sugar Co., Bay City, Mich.	John S. McEachern, Wiming-	Nov. 16, '06
1451	----do -----	do -----	ton. Carolina Feed Store, Raleigh.	Dec. 5, 1906
1637	----do -----	-----	do -----	-----
1758	----do -----	Michigan Sugar Co., Bay City Mich.	do -----	April 24, '07

DISCUSSION OF RESULTS.

Six (6) samples of beet pulp were examined. Samples 1798, 1835, 1452 and

CHOPS, HOMINY MEALS AND FEEDS.

The hard part of the corn kernel known as hominy, or hominy grits, is used for human food. The residue, or soft part of the kernel, sometimes called

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1457	Corn chops -----	Badger-Crittenden Mills, Milwaukee, Wis.	Harris & Hubbard, Reidsville, N. C.	Dec. 6, '06
1456	----do -----	Boney & Harper, Wilmington, N. C.	B. F. Mitchell & Co., Wilmington, N. C.	Nov. 16, '06
1632	----do -----	do -----	Farmville Land Co., Goldsboro, N. C.	Mar. 18, '07
1660	----do -----	do -----	Spencer & Harriette, New Bern, N. C.	Mar. 19, '07
1674	----do -----	do -----	Wells Grocery Co., Wilson, N. C.	Mar. 20, '07
1831	----do -----	do -----	Spencer & Harriette, New Bern, N. C.	July 19, '07
1832	----do -----	do -----	B. F. Mitchell & Co., Wilmington, N. C.	July 22, '07
1681	Hominy -----	Chesterfield Mills, Petersburg, Va.	Lewis & Co., Scotland Neck, N. C.	-----
1438	----do -----	Forsyth Roller Mills, Winston-Salem, N. C.	P. R. Lamb & Bro., Winston, N. C.	Dec. 21, '06
1871	Corn chops -----	do -----	Standard Feed and Seed Co., Winston, N. C.	Aug. 5, '07
1732	----do -----	Granite City Mills, Mount Airy, N. C.	G. C. Welsh, Mount Airy, N. C.	Apr. 18, '07
1500	----do -----	Mountain City Mills Co., Chattanooga, Tenn.	P. R. Lamb & Co., Winston, N. C.	Dec. 21, '06
1873	Feed Meal -----	do -----	G. W. Patterson, Concord, N. C.	Aug. 6, '07

It is composed in part of the cell walls of the beet root, and for this reason contains considerable crude fiber.

NATION OF BEET PULP.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1798	\$ 1.40	80	8.50	0.50	17.50	-----	7.87	1.03	17.25	3.60	Beet pulp.
1835	-----	100	8.50	0.50	20.00	-----	8.00	1.77	17.35	2.90	do.
1452	1.50	100	-----	-----	-----	-----	8.00	1.19	19.65	3.00	do.
1451	-----	100	-----	-----	-----	-----	8.37	1.33	18.90	3.04	do.
1637	-----	-----	-----	-----	-----	-----	9.50	0.63	17.83	2.95	do.
1758	-----	100	8.50	0.59	20.00	-----	9.87	0.78	17.55	2.37	do.

1451 were not up to their guarantee. Samples 1637 and 1758 were up to standard quality.

white meal, is sold as a cattle feed, and consists of the hull, germ and more or less of the protein and starch. It has a feeding value similar to dry corn meal.

CHOPS, HOMINY MEALS AND FEEDS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1457	\$ 1.65	100	-----	-----	-----	-----	15.75	-----	1.50	2.35	Corn product.
1456	-----	100	10.00	7.25	7.00	-----	10.37	10.95	8.54	2.60	do.
1652	1.40	100	10.00	7.25	7.50	-----	9.13	7.00	9.65	2.30	do.
1660	-----	100	10.00	4.00	7.50	-----	9.25	7.23	10.55	5.14	do.
1674	1.40	100	10.00	7.25	7.50	-----	10.12	7.57	10.14	2.40	do.
1831	1.55	100	10.00	7.25	7.50	-----	9.37	4.88	8.95	2.12	do.
1832	-----	100	10.00	7.25	7.50	-----	10.37	5.18	7.40	2.35	Corn chops.
1681	-----	-----	-----	-----	-----	-----	8.87	4.13	2.00	1.20	do.
1488	1.50	100	9.87	3.91	1.97	-----	9.38	-----	1.80	1.25	Corn product.
1871	-----	100	9.87	3.91	1.97	-----	13.56	3.08	1.48	1.35	do.
1732	1.50	100	9.50	4.00	4.00	-----	10.25	2.92	4.68	1.36	do.
1500	-----	-----	-----	-----	-----	-----	-----	2.44	.50	.73	do.
1873	-----	100	12.50	3.50	8.50	-----	14.37	5.44	5.20	3.67	Wheat and corn product.

RESULTS OF THE EXAMINATION OF CHOPS,

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1684	Corn Meal -----	H. F. Munt, Petersburg, Va.	R. J. Madry, Scotland Neck, N. C.	Mar. 21, '07
1740	Hominy Feed -----	Liberty Mills, Nashville, Tenn.	Henson Bros., Rockingham, N. C.	Mar. 30, '07
1473	Corn Meal -----	-----	Carolina Feed Storé, Raleigh, N. C.	-----

DISCUSSION OF RESULTS.

Thirty-eight (38) samples of chops, hominy meals and feeds were examined. The name "Chops" generally applies to a feed composed entirely of corn pro-

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1425	Cracked Corn -----	Boney & Harper, Wilming- ton, N. C.	Sent in by mill -----	-----
1822	---do-----	City Hay and Grain Co., Norfolk, Va.	E. R. Nixon & Co., Washing- ton, N. C.	July 26, '07
1640	---do-----	Cockade City Mills (branch) Petersburg, Va.	Sent in by mill -----	Feb. 19, '07
1825	---do-----	Dabney Brokerage Co., New- port News, Va.	Carolina Distributing Co., Washington, N. C.	July 26, '07
1824	---do-----	---do-----	Edenton Grocery Co., Eden- ton, N. C.	July 26, '07
1481	---do-----	Daisy Mills, Norfolk, Va.	---do-----	Nov. 23, '07
1826	---do-----	J. Havens, Washington, N. C.	Pamlico Grocery Co., Wash- ington, N. C.	July 26, '07
1527	---do-----	---do-----	J. Havens, Washington, N. C.	Nov. 21, '06
1692	---do-----	---do-----	E. K. Willis, Washington, N. C.	Mar. 23, '07
1734	---do (chicken feed)---	High Point Milling Co., High Point, N. C.	V. W. Idol & Co., High Point, N. C.	April 2, '07
1421	---do-----	Robert Johnson, Norfolk, Va.	Sent in by mill -----	-----
1816	---do-----	R. A. Justice, Manchester, Va.	New Bern Fruit Co., New Bern, N. C.	July 19, '07
1690	---do-----	Lynchburg Milling Co., Lynchburg, Va.	F. G. Paul & Bro., Washing- ton, N. C.	Mar. 23, '07
1820	---do-----	---do-----	E. K. Willis, Washington, N. C.	July 26, '07
1821	---do-----	---do-----	A. J. Cox & Co., Washing- ton, N. C.	July 26, '07
1689	---do-----	John W. Poole & Son, Peters- burg, Va.	F. V. Johnstone, Greenville, N. C.	Mar. 22, '07
1797	---do-----	Raleigh Milling Co., Raleigh, N. C.	Geo. Marsh & Co., Raleigh, N. C.	July 11, '07
1830	---do-----	Riverside Milling and Power Co., Cartersville, Ga.	Stone & Co., Wilmington, N. C.	July 22, '07
1823	---do (Blue Ribbon)---	Seaboard Brokerage Co., Norfolk, Va.	E. R. Nixon, Washington, N. C.	July 26, '07
1664	---do-----	S. D. Scott & Co., Norfolk, Va.	Burrus & Gray Co., New Bern, N. C.	Mar. 19, '07
1829	---do-----	---do-----	---do-----	July 19, '07
1828	---do-----	---do-----	Spencer & Harriette, New Bern, N. C.	July 19, '07
1827	---do-----	---do-----	C. B. Hill, New Bern, N. C.	July 19, '07
1819	---do-----	Wilson Grocery Co., Wilson, N. C.	Wilson Grocery Co., Wilson, N. C.	July 24, '07

HOMINY MEALS AND FEEDS.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1684	\$						10.25	3.07	1.68	1.20	Corn product.
1740		100	10.50	10.00	6.21		11.87	9.15	5.03	3.28	do.
1473							9.25	4.91	1.83	1.23	do.

ducts, but this is not strictly adhered to, as some chops are mixed with other substances.

The above samples are all pure corn products and of good quality.

TION OF CRACKED CORN.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—pet cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1425	\$						9.00	5.23	1.83	11.40	Corn product.
1822		100	10.00	4.00	4.00		9.37	2.88	1.90	1.45	do.
1640							10.00	4.67	1.86		Cracked corn.
1825		100	9.20	3.80			9.25	3.83	2.10	1.41	Corn product.
1824		100	9.20	3.80			8.12	3.07	1.73	1.31	do.
1481	1.35	100	10.00	4.00	4.00		9.50		1.75	1.65	Cracked corn.
1826		100	10.00	4.00	4.00		8.12	3.13	2.51	1.53	Corn product.
1527	1.25	100	10.00	4.00	4.00		8.63	3.09	2.20	1.36	Cracked corn.
1692	1.40	100	10.00	4.00	4.00		9.37	4.39	2.05	1.55	do.
1734	1.05	100	6.00	2.50	40.00		9.00	3.05	1.80	1.25	do.
1421							8.50	4.11	1.70	0.99	Corn product.
1816							8.75	4.41		1.62	do.
1690	1.00	100	10.00	4.00	4.00		8.75	3.12	1.38	1.34	Cracked corn.
1820		100	10.00	4.00	4.00		8.62	2.63	1.78	1.47	Corn product.
1821		100	10.00	4.00	4.00		8.25	2.95	1.55	1.59	do.
1689							8.75	3.43	1.55	3.29	Cracked corn.
1797							8.25	2.20	2.33	1.40	Corn product.
1830							8.62	2.04	1.40	1.57	do.
1823			10.00	4.00	2.00		8.87	3.11	1.50	1.33	do.
1664		100	10.00	4.00	4.00		9.50	2.27	1.45	1.43	Cracked corn.
1829		100	10.00	4.00	4.00		9.62	2.79	1.68	1.30	Corn product.
1828		100	10.00	4.00	4.00		9.00	4.05	2.10	1.37	do.
1827	1.60	100	10.00	4.00	4.00		10.37	3.80	2.10	1.45	do.
1819							9.37	1.90	2.70	1.75	do.

COTTON-SEED FEEDS.

If cotton-seed meal contains less than 38.6 per cent. protein it is below the standard required by the law on this subject and has had hulls or some other adulterant ground with it. Hulls are found with meal rather extensively and the mixture is no longer sold as genuine cotton-seed meal, but as cotton-seed

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1867	Cotton-seed Feed-----	Elba Manufacturing Co., Charlotte, N. C.	I. Lippman, Salisbury, N. C.	Aug. 5, '07
1868	---do-----	---do-----	Standard Feed and Seed Co., Winston-Salem, N. C.	Aug. 31, '07
1636	---do-----	---do-----	Overman & Co., Salisbury, N. C.	Dec. 19, '06
1486	---do-----	---do-----	G. M. Trent, Reidsville, N. C.	Dec. 6, '06
1730	---do-----	---do-----	V. W. Idol & Co., High Point, N. C.	Apr. 2, '07
1872	Cotton-seed Hull Feed	N. C. Cotton Oil Co., Charlotte, N. C.	Hutchison Bros., Reidsville, N. C.	Aug. 2, '07
1853	Cotton-seed Feed Meal	N. C. Cotton Oil Co., Wilmington, N. C.	John S. McEachern, Wilmington, N. C.	July 22, '07
1852	---do-----	---do-----	Brooks & Taylor, Wilmington, N. C.	July 22, '07
1851	---do-----	---do-----	B. F. Mitchell & Co., Wilmington, N. C.	July 22, '07
1850	---do-----	---do-----	W. B. Cooper, Wilmington, N. C.	July 22, '07
1588	Cotton-seed Feed-----	N. C. Cotton Oil Co., Charlotte, N. C.	Kennedy Bros., High Point, N. C.	Dec. 7, '06
1774	Cotton Mixed Feed-----	Statesville Oil and Fertilizer Co., Statesville, N. C.	Cooper & Gill, Statesville, N. C.	Apr. 9, '07
1563	Cotton Mixed Feed-----	Statesville Oil and Fertilizer Co., Statesville, N. C.	Cooper Bros., Statesville, N. C.	Dec. 10, '06
1877	---do-----	---do-----	Shelton Bros., Winston, N. C.	Aug. 5, '07
1567	Creamo Brand Feed Meal	Tennessee Fiber Co., Memphis, Tenn.	S. K. Breeding Co., Hendersonville, N. C.	Dec. 14, '06
1780	---do-----	---do-----	Asheville Grocery Co., Asheville, N. C.	Apr. 11, '07
1682	---do-----	---do-----	R. J. Madry, Scotland Neck, N. C.	Mar. 21, '07
1691	---do-----	---do-----	Carolina Distributing Co., Washington, N. C.	Mar. 23, '07
1897	---do-----	---do-----	Asheville Grocery Co., Asheville, N. C.	-----
1894	---do-----	---do-----	J. B. Ingle, Asheville, N. C.	Aug. 26, '07
1849	Universal compound	Universal Oil and Fertilizer Co., Wilmington, N. C.	The Worth Co., Wilmington, N. C.	July 22, '07

DISCUSSION OF RESULTS.

Twenty-one (21) samples of cotton-seed feeds were examined. These feeds

feed meal for cattle, etc. These feeds are valuable in proportion to the amount of meal in the mixture, which is measured by the protein in the analysis.

Cotton-seed feeds must have a guaranteed analysis consisting of the per cents. of protein, fat and crude fiber on every bag or tag attached thereto, and not the per cent. of nitrogen or ammonia.

TION OF COTTON-SEED FEEDS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1887	\$----	100	8.00	2.50	40.00	-----	9.62	.82	30.40	3.46	Cotton-seed hulls sprinkled with cotton-seed meal.
1868	-----	100	8.00	2.50	40.00	-----	13.87	3.12	36.20	3.98	do.
1636	-----	100	8.00	2.50	40.00	-----	7.50	1.77	39.58	-----	do.
1486	90	100	8.00	2.50	40.00	-----	10.00	3.41	37.70	2.92	do.
1730	-----	100	8.00	2.50	40.00	-----	9.39	1.53	33.43	3.25	Cotton-seed hulls sprinkled with cotton-seed meal.
1872	-----	100	8.00	2.50	40.00	-----	7.37	.83	33.30	2.70	do.
1833	1.50	100	26.00	3.00	28.00	-----	30.87	6.86	14.70	5.45	Cotton-seed meal and cotton-seed hulls.
1852	-----	100	26.00	3.00	28.00	-----	23.37	6.83	7.33	5.50	do.
1851	-----	100	26.00	3.00	28.00	-----	29.87	5.97	16.25	5.70	do.
1850	-----	100	26.00	3.00	28.00	-----	30.62	6.84	13.40	5.83	do.
1588	1.00	100	8.00	2.50	40.00	-----	10.75	2.01	-----	2.21	Cotton-seed hulls sprinkled with cotton-seed meal.
1774	-----	100	12.00	3.00	35.00	-----	8.50	4.18	-----	3.31	do.
1563	-----	100	12.00	3.00	35.00	-----	5.31	3.53	34.35	1.70	do.
1877	-----	100	12.00	3.00	35.00	-----	10.75	4.32	27.05	3.95	do.
1567	1.50	100	22.00	5.00	28.00	-----	24.00	5.89	17.08	4.82	Cotton-seed meal and cotton-seed hulls mixed.
1780	-----	100	22.00	5.00	28.00	-----	22.75	4.87	18.93	4.89	Cotton-seed meal containing ground cotton-seed hulls.
1632	1.50	100	22.00	5.00	28.00	-----	22.62	5.34	20.39	4.35	Cotton-seed meal and hulls finely ground.
1691	1.50	100	22.00	5.00	28.00	-----	18.88	4.76	19.75	4.10	do.
1897	-----	100	22.00	5.00	28.00	-----	20.37	3.83	19.13	4.45	do.
1894	-----	100	22.00	5.00	28.00	-----	20.60	5.25	20.40	4.40	do.
1849	-----	100	30.00	4.50	-----	-----	15.62	4.31	20.88	4.78	Cotton-seed meal and cotton-seed hulls.

are of good quality and are up to their guaranteed composition.

From the data above, their true quality and ingredients may be ascertained.

SPECIAL MIXED FEEDS.

Under this head is grouped those feeds which are sold under trade-mark.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1793	Protana Dustless Horse Feed.	Purina Mills, St. Louis, Mo.	Berry O'Kelly, Method, N. C.	June 19, '07
1742	Thoroughbred Feed -----	Lexington Roller Mills Co., Lexington, Ky.	Parker Bros. Hay & Grain Co., High Point, N. C.	Apr. 3, '07
1840	---do-----	do-----	Edwards & Pegram, Kingston, N. C.	July 18, '07
1839	---do-----	do-----	Sutherland Co., Goldsboro, N. C.	July 17, '07
1744	---do-----	do-----	Geo. Marsh & Co., Raleigh, N. C.	Apr. 24, '07
1469	Columbia Crushed Feed.	Callahan & Sons, Louisville, Ky.	Wilson Mercantile Co., Hendersonville, N. C.	Dec. 14, '06
1799	Herculean Feed-----	Carolina Feed Store, Raleigh, N. C.	Sent in by store-----	July 11, '07
1818	---do-----	do-----	do-----	July 20, '07
1583	Wyatts Special Cow Feed	Job P. Wyatt & Sons, Raleigh, N. C.	J. P. Wyatt & Sons, Raleigh, N. C.	Dec. 4, '06
1795	---do-----	do-----	do-----	July 11, '07
1905	Cooked Cow Feed-----	Southern Cooked Feed Co., Nashville, Tenn.	Crow Bros., Monroe, N. C.	Sept. 21, '07
1906	---do-----	do-----	C. V. Williams, Hamlet, N. C.	Sept. 24, '07
1907	Cooked Horse Feed-----	do-----	do-----	Sept. 24, '07

DISCUSSION OF RESULTS.

Thirteen (13) samples of special named feeds were examined. Most of

MEAT FEEDS.

These feeds are meat products and contain a high per cent. of protein, which

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1704	Rava Meat Meal-----	Diggs & Beadles, Richmond, Va.	Sent in by manufacturers-----	
1791	Darlings Beef Meal-----	T. W. Wood & Sons, Richmond, Va.	Wm. L. Larders, Durham, N. C.	June 3, '07
1885	Meat Product-----	do-----	D. P. High, Whiteville, N. C.	

DISCUSSION OF RESULTS.

Three (3) samples of meat feeds were examined, and were found to be of good quality.

proprietary or special names.

OF SPECIAL MIXED FEEDS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1793	\$1.75	100	12.50	3.50	-----	-----	13.50	4.13	-----	4.68	Corn, oats, wheat product and alfalfa meal.
1742	1.50	100	15.59	4.77	6.25	-----	15.37	5.04	5.45	4.56	Wheat and corn product.
1840	1.50	100	15.59	4.77	6.25	-----	14.62	4.00	5.85	4.70	do.
1839	1.50	100	15.59	4.77	6.25	-----	14.00	4.09	8.13	6.63	do.
1744	-----	100	15.59	4.77	6.25	-----	15.10	3.53	5.78	4.90	do.
1469	1.75	100	13.75	4.40	5.00	-----	10.50	4.84	6.43	2.96	
1799	1.50	80	14.00	6.00	8.00	-----	-----	6.48	5.79		Corn, oats, heet pulp, wheat product.
1818	1.50	80	-----	-----	-----	-----	11.44	5.85	6.95	-----	do.
1583	1.60	100	21.00	3.50	14.00	-----	23.33	5.63	6.50	4.95	Wheat product, cotton-seed meal, linseed meal, corn meal.
1795	1.65	100	21.00	3.50	14.00	-----	21.13	3.05	5.85	5.21	do.
1905	-----	100	26.00	7.50	8.20	-----	23.44	5.85	6.28	7.96	Malt sprouts, barley and cotton-seed meal.
1906	-----	100	26.00	7.50	8.20	-----	23.00	5.63	9.95	9.60	do.
1907	-----	100	12.50	5.64	9.54	-----	10.94	5.25	8.80	3.48	Cracked corn, oats and barley.

these feeds are of good quality and up to their guarantees.

makes them a very valuable product for animals. They are high-priced, and should be used intelligently.

TION OF MEAT FEEDS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1704	\$-----	-----	-----	-----	-----	-----	85.37	6.52	0.36	-----	Meat Product.
1791	-----	-----	-----	-----	-----	-----	39.37	10.79	3.20	-----	do.
1885	-----	-----	-----	-----	-----	-----	55.38	6.18	2.60	-----	do.

MISCELLANEOUS FEEDS.

Under this head is grouped mill feeds, mixed feeds, mill sweepings, screen-

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1903	Feed-----	Aberdeen Power and Milling Co., Aberdeen, N. C.	Aberdeen, N. C.	Sept. 26, '07
1445	Mill feed-----	Archdale Roller Mills, Archdale, N. C.	J. S. Kinley, High Point, N. C.	Dec. 7, '06
1449	---do-----	---do-----	Kennedy Bros., High Point, N. C.	Dec. 7, '06
1706	---do-----	---do-----	---do-----	April 3, '07
1643	Mixed feed-----	Atlanta Milling Co., Atlanta, Ga.	Sent in by mill-----	Feb. 22, '07
1695	Corn bran-----	Aydlett Bros., Elizabeth City, N. C.	Aydlett Mill Co., Elizabeth City, N. C.	Mar. 25, '07
1604	Sucrene Poultry Feed---	American Milling Co., Chicago, Ill.	Culbreth & Co., Fayetteville, N. C.	Jan. 11, '07
1831	Feed-----	W. E. Balingier, Guilford College, N. C.	Sent in by mill-----	Sept. 28, '07
1590	Mill feed-----	Concord Milling Co., Concord, N. C.	---do-----	Nov. 14, '06
1427	Mixed feed-----	Chesterfield Manufacturing Co., Petersburg, Va.	---do-----	Oct. 15, '06
1426	Feed-----	---do-----	---do-----	Oct. 15, '06
1467	---do-----	---do-----	Edwards & Pegram, Kinston, N. C.	Nov. 17, '06
1671	Cow feed-----	---do-----	Hocker, Churchill & Co., Kinston, N. C.	Mar. 20, '07
1591	Mill feed-----	---do-----	---do-----	Jan. 1, '07
1902	Feed-----	Cochran & McLaughlin, Charlotte, N. C.	Sent in by manufacturer---	Sept. 26, '07
1472	Mill feed-----	Concord Milling Co., Concord, N. C.	Cannon & Fetzer Co., Concord, N. C.	Dec. 18, '06
1635	Feed-----	Douthat Riddle Co., Danville, Va.	Sent in by mill-----	Feb. 19, '06
1842	Mill feed-----	Durham Roller Mills, Durham, N. C.	Sutherland Co., Goldsboro, N. C.	July 18, '07
1523	---do-----	Herman De Rundeau, Crimora, Va.	Cramer Bros., Winston, N. C.	Dec. 21, '06
1524	---do-----	---do-----	Beacom Bros., Henderson, N. C.	Nov. 24, '06
1647	Feed-----	The Hanson Mill Co., Dillsboro, N. C.	Sent in by mill-----	Feb. 27, '07
1523	Mill feed-----	Hicks & Hirshman, Lock Seventeen, Ohio.	J. P. Wyatt & Bro., Raleigh, N. C.	Dec. 5, '06
1885	Feedstuff-----	---do-----	D. P. High, Whiteville, N. C.	Aug. 19, '07
1529	Mill feed-----	High Point Milling Co., High Point, N. C.	Sampled at mill, High Point, N. C.	Dec. 7, '06
1526	The H.-O. Co's., Dairy feed.	---do-----	W. S. White & Co., Elizabeth City, N. C.	Nov. 26, '06
1789	Mill feed-----	Hope Mills, Versailles, Ky.	Sent in by mill-----	-----
1788	Wheat bran, corn bran and shorts.	Home Milling Co., Lenoir, N. C.	---do-----	-----
1595	Mill feed-----	---do-----	J. V. Lennard, Catawba, N. C.	-----
1658	Mixed feed-----	J. A. Meadows, New Bern, N. C.	C. B. Hill, New Bern, N. C.	Mar. 19, '07
1665	---do-----	---do-----	J. A. Meadows, New Bern, N. C.	Mar. 19, '07
1669	---do-----	---do-----	Hooker, Churchill & Co., Kinston, N. C.	Mar. 20, '07
1841	---do-----	---do-----	New Bern Fruit Co., New Bern, N. C.	July 19, '07
1757	---do-----	Model Mills, Lexington, N. C.	W. H. Maffett, Lexington, N. C.	Apr. 17, '07

ings, feed meals, etc. An idea of the quality of these feeds is given in the table below.

TION OF MISCELLANEOUS FEEDS.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1903	\$	-----	-----	-----	-----	-----	9.13	4.83	8.53	-----	
1448	1.30	-----	13.00	2.50	4.00	-----	13.62	2.77	2.72	1.87	Wheat and corn product.
1449	1.30	-----	13.00	2.50	4.00	-----	13.94	2.57	2.97	2.20	do.
1706	1.30	-----	13.00	2.50	3.75	-----	12.25	-----	2.45	2.08	do.
1643	-----	-----	-----	-----	-----	-----	14.87	6.20	4.77	-----	do.
1696	-----	-----	-----	-----	-----	-----	9.12	3.93	8.73	1.64	Corn bran.
1604	-----	-----	17.50	5.50	-----	-----	16.87	5.52	10.73	6.02	Oats, barley, some whole wheat, weed seeds.
1881	-----	-----	9.75	3.38	.80	-----	9.75	3.38	.80	-----	do.
1590	-----	-----	-----	-----	-----	-----	18.37	-----	4.28	2.44	Wheat and corn product.
1427	-----	-----	-----	-----	-----	-----	8.44	3.76	17.88	-----	Some oats, mostly oat hulls.
1426	-----	-----	-----	-----	-----	-----	13.92	5.94	12.04	-----	Wheat bran, corn bran, oats and oat hulls.
1467	-----	-----	-----	-----	-----	-----	12.25	4.65	21.20	4.87	Corn bran, oats and oat hulls.
1671	1.40	-----	13.92	5.94	-----	-----	7.25	2.23	17.48	4.65	Mostly corn bran and oat hulls.
1591	-----	-----	-----	-----	-----	-----	15.37	3.15	3.53	3.12	
1902	-----	-----	-----	-----	-----	-----	14.57	5.91	6.15	-----	
1472	-----	-----	-----	-----	-----	-----	14.75	2.48	4.18	2.35	Wheat product.
1638	-----	-----	-----	-----	-----	-----	9.75	3.59	11.97	-----	Wheat and corn product.
1842	-----	-----	14.00	4.00	5.00	-----	14.37	3.97	5.70	3.70	do.
1523	1.35	-----	14.50	4.00	8.00	-----	16.25	6.28	6.05	4.78	Wheat product.
1524	-----	-----	14.50	4.00	8.00	-----	18.00	6.61	5.30	4.35	do.
1647	-----	-----	-----	-----	-----	-----	15.62	4.10	2.11	-----	do.
1525	1.50	-----	-----	-----	-----	-----	15.62	6.50	3.85	-----	do.
1885	-----	-----	-----	-----	-----	-----	55.38	6.18	2.60	-----	do.
1529	1.30	-----	10.00	3.00	3.50	-----	12.50	5.18	3.95	1.60	do.
1526	-----	-----	18.00	4.50	-----	-----	19.75	4.15	10.00	3.73	Ground oats, peas, corn and gluten feed.
1789	-----	-----	16.12	4.00	7.22	-----	16.12	4.00	7.22	-----	Wheat and corn product.
1788	-----	-----	15.12	5.69	6.59	-----	15.12	5.69	6.59	-----	Wheat product and corn bran.
1595	-----	-----	-----	-----	-----	-----	-----	3.00	11.98	3.30	
1658	-----	100	12.00	1.50	4.50	-----	9.75	3.66	4.80	1.98	Wheat and corn product.
1665	1.35	100	12.00	1.50	4.50	-----	10.12	3.78	4.40	3.04	Corn, oats and wheat product.
1669	-----	100	12.00	1.50	4.50	-----	10.37	4.46	4.38	1.90	do.
1841	-----	100	12.00	1.50	4.50	-----	14.62	2.13	8.00	6.19	Corn and oat product.
1757	1.45	100	12.00	3.50	4.00	-----	11.37	2.88	4.50	2.89	Wheat bran and corn meal.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1437	Mixed feeds -----	The Moore Milling Co., Hickory, N. C.	Sent in by mill.	Nov. 26, '06
1503	----do -----	-----do -----	J. S. Setzer & Son, Hickory, N. C.	Dec. 10, --
1424	Feed -----	F. S. Moss & Bro., Chatham, Va.	Sent in by mill.	Nov. 3, '06
1805	----do -----	Moses Winston, Selma, N. C.	Moses Winston, Selma, N. C.	July 17, '07
1876	Mixed feed -----	Newport Mill Co., Newport, Tenn.	I. Lippmann, Salisbury, N. C.	Aug. 5, '07
1783	----do -----	-----do -----	Bristol & Harbison, Morgan- ton, N. C.	Apr. 16, '07
1889	----do -----	-----do -----	O. M. Boyd & Co., Gastonia, N. C.	Aug. 23, '07
1891	----do -----	-----do -----	McLean Bros, Gastonia, N. C.	Aug. 23, '07
1898	Mixed feed -----	Newport Mill Co., Newport, Tenn.	Asheville Grocery Co., Asheville, N. C.	-----
1703	Corn and cob meal -----	Page Milling Co., Luray, Va.	Sent in by mill.	-----
1702	Feed meal -----	-----do -----	-----do -----	-----
1792	Mixed feed -----	R. C. Poage Milling Co., Ashland, Ky.	-----do -----	-----
1552	Feed -----	W. F. Richardson, Jr., Co., Richmond, Va.	Hutchison Bros., Reidsville, N. C.	Dec. 6, '06
1887	Mill feed -----	Riverside Milling Power Co., Cartersville, Ga.	Chambers & Moody, Charlotte, N. C.	Aug. 22, '07
1890	----do -----	-----do -----	Shuford Co., Gastonia, N. C.	Aug. 23, '07
1551	----do -----	-----do -----	G. L. Dull & Co., Winston, N. C.	Dec. 21, '06
1770	----do -----	-----do -----	Hardison Co., Wadesboro, N. C.	Apr. 1, '07
1804	----do -----	-----do -----	C. A. Norris, Raleigh, N. C.	July 11, '07
1554	Feed -----	Rockbridge Roller Mills, East Lexington, Va.	Phillips & Penny, Raleigh, N. C.	Dec. 8, '06
1550	----do -----	Rockingham Milling Co., McGaheysville, Va.	Davidson & Wolfe, Charlotte, N. C.	Dec. 12, '06
1597	----do -----	-----do -----	Sent in by mill -----	-----
1836	Royall feed -----	Spencer & Harriette, New Bern, N. C.	Spencer & Harriette, New Bern, N. C.	May 19, '07
1661	----do -----	-----do -----	-----do -----	Mar. 19, '07
1598	Bran and corn -----	C. W. Thayer Sons & Co., Thomasville, N. C.	Sent in by mill -----	-----
1573	Feed -----	J. H. Walker & Co., Reidsville, N. C.	Job P. Wyatt & Bro., Raleigh, N. C.	Dec. 5, '06
1575	Chop feed -----	A. W. Watson, Greensboro, N. C.	J. H. Law, Greensboro, N. C.	Dec. 7, '07
1574	Feed -----	-----do -----	W. R. Pickard, Greensboro, N. C.	Dec. 7, '06
1585	----do -----	W. S. White, Elizabeth City, N. C.	W. S. White & Co., Elizabeth City, N. C.	Oct. 26, '06
1648	----do -----	L. O. Willard, Jamestown, N. C.	Sent in by mill. -----	-----
1720	Corn and Oat feed -----	S. T. Beveridge & Co., Richmond, Va.	J. H. McDuffie, Laurinburg, N. C.	Mar. 30, '07
1747	Stock meal -----	Manchester Mills, Manchester, Va.	L. H. Adams, Raleigh, N. C.	Apr. 24, '07

DISCUSSION OF RESULTS.

Sixty-five (65) samples of miscellaneous feeds were examined. A critical examination of the above table will reveal the true quality of these feeds.

OF MISCELLANEOUS FEEDS.—CONTINUED.

Laboratory Number.	Retail Price of Package.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
			Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1437	\$						8.75	4.01	5.80		Wheat, corn and oat product.
1503							11.00	3.89	6.40	3.05	Some broken wheat, ground oats, corn bran.
1424							16.37	5.11	7.01	.52	Wheat product.
1805							14.00	1.87	3.18	2.77	do.
1876	1.40	80	13.00	4.00	8.00		13.50	3.42	7.15	4.29	Wheat and corn product.
1783		80	13.00	4.00	8.00		11.00	3.38	3.23	2.52	Wheat bran and corn bran.
1889		80	13.00	4.00	8.00		13.37	5.63	6.60	4.50	Wheat and corn product.
1891		80	13.00	4.00	8.00		13.12	4.67	5.95	3.70	Wheat bran and corn bran.
1898		80	13.00	4.00	8.00		12.87	4.07	6.33	3.85	Wheat and corn product.
1703							8.75	3.44	3.00		Corn and cob meal.
1702							9.50	3.60	2.20		Corn product.
1742							14.00	4.18	6.65		Wheat and corn product.
1552	1.70	100					17.62	4.98	1.93	2.95	Wheat product.
1887		100	14.00	3.79	4.43		12.62	3.75	4.50	3.20	Wheat and corn product.
1890		80	12.38	4.32			11.37	3.80	3.95	2.83	do.
1551	1.50	100	12.38	4.32			13.37	5.49	4.43	3.85	do.
1770	1.40	100	12.38	4.32			10.75	3.04	4.50	2.83	do.
1804	1.60	100	14.00	3.79	4.43		10.37	1.30	3.82	3.62	do.
1554			14.50	4.00	8.00		16.37	4.04	3.60	3.88	Wheat product.
1550		100					15.96	5.96	4.85	3.83	do.
1597							17.25	4.44	9.50		do.
1836	1.55	100	10.00	6.00	7.00		10.62	6.89	9.30	1.80	Corn and oat product.
1661	1.35	100	10.00	6.00	7.00		9.37	7.10	9.58	2.45	Wheat, corn and oat product.
1598							11.25	3.95	12.50		Wheat bran and corn product.
1573	1.50	100	12.37	4.11	7.57		10.50	2.94	8.78	3.57	
1575	1.60	100	13.86	3.95	4.68		13.62	2.89	4.33	3.00	Wheat and corn product.
1574								2.13	2.15	1.94	Wheat product.
1585								17.18	5.53	3.93	Ground beans and peas.
1648							11.63	3.76	2.72		Wheat and corn product.
1720		100	9.00	4.00			7.75	1.64	10.40	3.35	Some ground corn and oats, but mostly oat hulls.
1747	1.30	100	8.12	2.74	3.38		8.75	2.95	6.40	1.30	Corn product.

THE MICROSCOPIC EXAMINATION OF FEEDS.

It was not possible to make chemical analyses of all samples collected, but

MICROSCOPIC

Laboratory Number.		
	Brand Name from Label.	Manufacturer or Wholesaler.
194 M	Shipstuff -----	Atlanta Milling Co., Atlanta, Ga. -----
109 M	Bran and shorts -----	---do -----
172 M	Mill feed -----	Aberdeen Milling and Power Co., Aberdeen, N. C. ---
177 M	---do -----	---do -----
197 M	---do -----	---do -----
157 M	Bran -----	Asheville Milling Co., Asheville, N. C. -----
159 M	---do -----	---do -----
163 M	Middlings -----	---do -----
164 M	Shorts -----	---do -----
56 M	Mixed bran -----	---do -----
195 M	Shipstuff -----	Ballard & Ballard, Louisville, Ky. -----
150 M	Bran -----	---do -----
149 M	Shipstuff -----	---do -----
146 M	---do -----	---do -----
145 M	Bran -----	Ballard & Ballard, Louisville, Ky. -----
143 M	---do -----	---do -----
58 M	---do -----	---do -----
57 M	Shipstuff -----	---do -----
134 M	Corn Chops -----	Boney & Harper, Wilmington, N. C. -----
59 M	---do -----	---do -----
60 M	Rice Meal -----	Carolina Rice Mills, Goldsboro, N. C. -----
61 M	---do -----	---do -----
209 M	Shipstuff -----	Dan Valley Mills, Danville, Va. -----
62 M	---do -----	---do -----
63 M	---do -----	---do -----
64 M	---do -----	---do -----
65 M	---do -----	---do -----
66 M	---do -----	---do -----
126 M	---do -----	---do -----
147 M	---do -----	---do -----
152 M	---do -----	---do -----
153 M	Bran -----	---do -----
102 M	---do -----	---do -----
142 M	---do -----	---do -----
148 M	---do -----	---do -----

microscopic examinations were made of all samples. The results of the microscopic examination of samples are brought together below:

EXAMINATION.

Laboratory Number.	Retail Dealer.	Date of Collection.	Ingredients.
194 M	Wilson & Fossell, Aberdeen, N. C.-----	Sept. 28, '07	Wheat and corn product.
109 M	C. A. Forester, Wikesboro, N. C.-----	Apr. 18, '07	Wheat product.
172 M	Tanner Bros., Rockingham, N. C.-----	Sept. 20, '07	Mostly a corn product.
177 M	D. E. Latewood, Wadesboro, N. C.-----	Sept. 23, '07	do.
197 M	Keith & Co., Aberdeen, N. C.-----	Sept. 28, '07	do.
157 M	Cochrane-McLaughlin Co., Charlotte, N. C.---	Aug. 22, '07	Wheat and corn product.
159 M	O. M. Boyd & Co., Gastonia, N. C.-----	Aug. 23, '07	Wheat product.
163 M	Seigler & Co., Asheville, N. C.-----	Aug. 27, '07	do.
164 M	J. B. Ingle, Asheville, N. C.-----	Aug. 26, '07	do.
56 M	J. B. Schochet, Asheville, N. C.-----	Dec. 14, '06	Wheat bran and corn bran.
195 M	Mark Wimberly, Aberdeen, N. C.-----	Sept. 28, '07	Wheat product.
150 M	R. G. Hyatt, Greensboro, N. C.-----	Aug. 1, '07	do.
149 M	Irwin & Tucker, Greensboro, N. C.-----	Aug. 1, '07	do.
146 M	C. B. Hill, New Bern, N. C.-----	July 19, '07	do.
145 M	M. G. Brown, Edenton, N. C.-----	July 24, '07	Wheat product.
143 M	Burrus & Gray, New Bern, N. C.-----	July 19, '07	do.
58 M	M. G. Brown, Edenton, N. C.-----	Nov. 23, '06	do.
57 M	E. A. Kelly & Co., Henderson, N. C.-----	Nov. 24, '06	do.
134 M	The Worth Co., Wilmington, N. C.-----	July 22, '07	Corn product.
59 M	John S. McEachern, Wilmington, N. C.-----	Nov. 16, '06	do.
60 M	J. W. Isler, Goldsboro, N. C.-----	Nov. 15, '06	Rice product.
61 M	Best & Thompson, Goldsboro, N. C.-----	Nov. 15, '06	do.
209 M	R. R. Seagrove, Moncure, N. C.-----	Sept. 30, '07	Wheat product.
62 M	R. G. Hyatt, Greensboro, N. C.-----	Dec. 7, '06	do.
63 M	George Marsh & Co., Raleigh, N. C.-----	Dec. 5, '06	do.
64 M	J. C. Eason & Son, Goldsboro, N. C.-----	Nov. 15, '06	do.
65 M	Cramer Bros., & Co., Winston, N. C.-----	Dec. 21, '06	do.
66 M	Thompson Grain and Feed Store, Salisbury, N. C.	Dec. 19, '06	do.
126 M	George Marsh & Co., Raleigh, N. C.-----	July 11, '07	do.
147 M	Best & Thompson, Goldsboro, N. C.-----	July 18, '07	do.
152 M	R. G. Hyatt, Greensboro, N. C.-----	Aug. 1, '07	do.
153 M	Dailey & Smith, Greensboro, N. C.-----	Aug. 1, '07	do.
102 M	Phillips & Penny, Raleigh, N. C.-----	-----	do.
142 M	B. F. Mitchell & Co., Wilmington, N. C.-----	July 22, '07	do.
148 M	Best & Thompson, Goldsboro, N. C.-----	July 18, '07	do.

MICROSCOPIC EXAMINATIONS

Laboratory Number.	Brand Name from Label.		Manufacturer or Wholesaler.	
151 M	Shipstuff	-----	Dan Valley Mills, Danville, Va.	-----
210 M	Middlings	-----	Dunlop Milling Co., Clarkesville, Tenn.	-----
192 M	Shipstuff	-----	Dunlop Mills, Richmond, Va.	-----
189 M	---do	-----	---do	-----
187 M	---do	-----	---do	-----
183 M	Bran	-----	Dunlop Milling Co., Clarkesville, Tenn.	-----
67 M	---do	-----	Dunlop Mills, Richmond, Va.	-----
140 M	---do	-----	---do	-----
175 M	Shipstuff	-----	---do	-----
118 M	---do	-----	---do	-----
117 M	---do	-----	---do	-----
97 M	---do	-----	---do	-----
69 M	---do	-----	---do	-----
68 M	---do	-----	---do	-----
72 M	---do	-----	High Point Milling Co., High Point, N. C.	-----
73 M	---do	-----	---do	-----
211 M	Thoroughbred Feed	-----	Lexington Roller Mill Co., Lexington, Ky.	-----
176 M	---do	-----	---do	-----
141 M	---do	-----	---do	-----
107 M	Bran	-----	Liberty Mills, Nashville, Tenn.	-----
108 M	Shorts	-----	---do	-----
135 M	Bran	-----	---do	-----
144 M	Shorts	-----	---do	-----
167 M	Bran	-----	---do	-----
182 M	---do	-----	---do	-----
200 M	Shorts	-----	Liberty Mills, Nashville, Tenn.	-----
204 M	Bran and shorts	-----	Liberty Milling Co., Liberty, N. C.	-----
103 M	Shipstuff	-----	Mayo Milling Co., Richmond, Va.	-----
178 M	---do	-----	---do	-----
205 M	---do	-----	Mountain City Mill Co., Chattanooga, Tenn.	-----
203 M	---do	-----	---do	-----
190 M	---do	-----	---do	-----
173 M	---do	-----	---do	-----
166 M	---do	-----	---do	-----
162 M	---do	-----	---do	-----
111 M	---do	-----	---do	-----
106 M	---do	-----	---do	-----
105 M	---do	-----	---do	-----

NATION.—CONTINUED.

Laboratory Number.	Retail Dealer.	Date of Collection.	Ingredients.
151 M	Standard Feed and Seed Co., Winston, N. C.	August '07	Wheat product.
210 M	Hardison Co., Wadesboro, N. C.	Sept. 23, '07	do.
192 M	Crump & Floyd, Lumberton, N. C.	Sept. 27, '07	do.
189 M	Caldwell & Carlyle, Lumberton, N. C.	Sept. 27, '07	do.
187 M	J. M. Evans, Laurinburg, N. C.	Sept. 26, '07	do.
183 M	J. W. Carter, Maxton, N. C.	Sept. 25, '07	do.
67 M	Edwards & Pegram, Kinston, N. C.	Nov. 17, '06	do.
140 M	The Worth Co., Wilmington, N. C.	July 22, '07	do.
175 M	K. W. Ashcraft, Wadesboro, N. C.	Sept. 23, '07	do.
118 M	Q. K. Nimocks & Co., Fayetteville, N. C.	Mar. 25, '07	do.
117 M	J. P. Wyatt & Son, Raleigh, N. C.	Apr. 24, '07	do.
97 M	Barnes & Edgerton Co., Smithfield, N. C.	Jan. 10, '07	do.
69 M	Howard Williams & Co., Wilson, N. C.	Nov. 18, '07	do.
68 M	Edwards & Pegram, Kinston, N. C.	Nov. 17, '07	do.
72 M	High Point Milling Co., High Point, N. C.	Dec. 7, '06	do.
73 M	do.	Dec. 7, '06	do.
211 M	H. W. Little & Co., Wadesboro, N. C.	Aug. 23, '07	Wheat and corn product.
176 M	F. C. Allen, Wadesboro, N. C.	Sept. 23, '07	Wheat and corn product.
141 M	Tomlinson & Co., Wilson, N. C.	July 24, '07	do.
107 M	John H. Jenkins, Asheville, N. C.	Apr. 11, '07	Wheat product.
108 M	W. Poster, Rockingham, N. C.	Mar. 30, '07	do.
135 M	John S. McEachern, Wilmington, N. C.	July 22, '07	do.
144 M	do.	July 22, '07	do.
167 M	Green Kincaid, Morganton, N. C.	Sept. 7, '07	Wheat bran.
182 M	M. L. Millikin & Bro., Hamlet, N. C.	Sept. 24, '07	Wheat product.
200 M	E. D. Nall, Sanford, N. C.	Sept. 30, '07	Wheat product.
204 M	Mrs. J. R. Watson, Jonesboro, N. C.	Sept. 30, '07	do.
103 M	W. T. Buchanan, Sanford, N. C.	April 2, '07	do.
178 M	Rice & Folson, Hamlet, N. C.	Oct. 24, '07	do.
205 M	J. B. Buchanan, Jonesboro, N. C.	Oct. 30, '07	Wheat and corn product.
203 M	W. T. Buchanan, Sanford, N. C.	Oct. 30, '07	do.
190 M	Caldwell & Carlyle, Lumberton, N. C.	Oct. 27, '07	do.
173 M	Whittlock & Morrison, Rockingham, N. C.	Oct. 20, '07	do.
166 M	J. H. Pearson, Morganton, N. C.	Oct. 7, '07	Wheat and corn bran.
162 M	Seigler & Co., Asheville, N. C.	Aug. 16, '07	Wheat and corn product.
111 M	Liles & Hamilton, Hamlet, N. C.	April 2, '07	do.
106 M	A. P. Barrett, Rockingham, N. C.	Mar. 20, '07	Wheat bran and corn bran.
105 M	Caldwell & Carlyle, Lumberton, N. C.	Mar. 29, '07	do.

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
104 M	Shipstuff	Mountain City Mill Co., Chattanooga, Tenn.
100 M	---do---	---do---
158 M	Mill feed	Riverside Milling and Power Co., Cartersville, Ga.
191 M	---do---	---do---
193 M	---do---	---do---
158 M	Brown shorts	---do---
84 M	Bran	Read Bros., Morristown, Tenn.
115 M	---do---	---do---
161 M	---do---	---do---
165 M	---do---	---do---
88 M	---do---	Southern Mills, Nashville, Tenn.
188 M	---do---	---do---
128 M	---do---	---do---
87 M	Shipstuff	Statesville Flour Mills, Statesville, N. C.
86 M	---do---	---do---
85 M	---do---	---do---
91 M	Bran	---do---
77 M	Shipstuff	Mountain City Milling Co., Chattanooga, Tenn.
76 M	---do---	---do---
75 M	---do---	---do---
110 M	Bran	---do---
99 M	---do---	---do---
206 M	Shipstuff	Piedmont Mills, Lynchburg, Va.
81 M	---do---	---do---
80 M	---do---	---do---
79 M	---do---	---do---
116 M	Bran	---do---
155 M	---do---	---do---
82 M	Red Dog Middlings	---do---
83 M	---do---	---do---
114 M	Mill feed	Riverside Milling and Power Co., Cartersville, Ga.
160 M	---do---	---do---
90 M	Bran	Statesville Flour Mills, Statesville, N. C.
89 M	Bran and shorts	---do---
196 M	Shipstuff	J. Allen Smith & Co., Knoxville, Tenn.
154 M	---do---	---do---

NATION.—CONTINUED.

Laboratory Number.	Retail Dealer.	Date of Collection.	Ingredients.
104 M	J. H. Wishart, Lumberton, N. C. -----	Mar. 29, '07	Wheat and corn product.
100 M	Leak & Marshall, Wadesboro, N. C. -----	April 1, '07	do.
158 M	J. T. McNeal & Co., Red Springs, N. C. -----	Sept. 25, '07	do.
191 M	K. M. Biggs, Lumberton, N. C. -----	Sept. 27, '07	do.
193 M	L. H. Caldwell, Lumberton, N. C. -----	Sept. 27, '07	do.
158 M	J. F. Jamison, Charlotte, N. C. -----	Aug. 22, '07	do.
84 M	Bristol & Harbison, Morganton, N. C. -----	Dec. 11, '06	Wheat product.
115 M	Simpson Grocery Co., Statesville, N. C. -----	April 9, '07	do.
161 M	J. B. Schocet, Asheville, N. C. -----	Aug. 26, '07	do.
165 M	J. B. Ingle, Asheville, N. C. -----	Aug. 26, '07	do.
88 M	J. P. Wyatt & Bro., Raleigh, N. C. -----	Dec. 5, '06	do.
188 M	R. E. Lee, Laurinburg, N. C. -----	Sept. 26, '07	do.
128 M	Len H. Adams, Raleigh, N. C. -----	July 11, '07	do.
87 M	J. H. Law, Greensboro, N. C. -----	Dec. 7, '06	do.
86 M	Forney & Co., Morganton, N. C. -----	Dec. 11, '06	do.
85 M	W. R. Picard, Greensboro, N. C. -----	Dec. 7, '06	do.
91 M	J. C. Turner & Co., Statesville, N. C. -----	Dec. 10, '06	do.
77 M	C. H. Wray, Waynesville, N. C. -----	Dec. 13, '06	Wheat and corn product.
76 M	Joe McCormack, Hendersonville, N. C. -----	Dec. 14, '06	do.
75 M	Bost & Newton, Hickory, N. C. -----	Dec. 10, '06	do.
110 M	J. L. Cowan, Statesville, N. C. -----	April 9, '07	Wheat bran and corn bran.
99 M	J. D. & J. A. Glenn Co., Gastonia, N. C. -----	Jan. 16, '07	do.
206 M	J. R. Avent, Jonesboro, N. C. -----	Oct. 30, '07	Wheat product.
81 M	The Patterson Co., Greensboro, N. C. -----	Dec. 7, '06	do.
80 M	Morrison Produce and Provision Co., Statesville, N. C. -----	Dec. 10, '06	do.
79 M	Glenn & Carroll, Concord, N. C. -----	Dec. 18, '06	do.
116 M	Morrison Produce and Provision Co., Statesville, N. C. -----	April 9, '07	do.
155 M	F. M. Poore, Mt. Airy, N. C. -----	Aug. 3, '07	do.
82 M	G. L. Dull & Co., Winston, N. C. -----	Dec. 21, '06	do.
83 M	The Patterson Co., Greensboro, N. C. -----	Dec. 7, '06	do.
114 M	J. H. Tice, Wadesboro, N. C. -----	April 1, '07	Wheat product and corn bran.
160 M	McLean Bros., Gastonia, N. C. -----	Aug. 23, '07	Wheat and corn product.
90 M	W. R. Picard, Greensboro, N. C. -----	Dec. 7, '06	Wheat product.
89 M	Kluttz & Rendleman, Salisbury, N. C. -----	Dec. 19, '06	do.
196 M	Mark Wimberly, Aberdeen, N. C. -----	Sept. 28, '07	Wheat and corn product.
154 M	P. R. Lamb & Co., Winston, N. C. -----	Aug. 5, '07	do.

MICROSCOPIC EXAM

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
131 M	Shipstuff -----	J. Allen Smith & Co., Knoxville, Tenn. -----
121 M	---do -----	---do -----
120 M	---do -----	---do -----
119 M	---do -----	---do -----
74 M	---do -----	---do -----
113 M	---do -----	Tennessee Mill Co., Estill Springs, Tenn. -----
92 M	---do -----	---do -----
101 M	---do -----	---do -----
169 M	---do -----	---do -----
137 M	Bran -----	---do -----
138 M	---do -----	---do -----
170 M	---do -----	---do -----
179 M	Shipstuff -----	Warner Moore & Co., Richmond, Va. -----
132 M	Bran -----	Washburn-Crosby Milling Co., Louisville, Ky. -----
93 M	Standard middlings -----	---do -----
71 M	Mixed bran -----	Hickory Milling Co., Hickory, N. C. -----
98 M	Bran and shorts -----	Moore Milling Co., Hickory, N. C. -----
70 M	Bran -----	Horne Bros. & Johnstone, Mecklenburg, N. C. -----
78 M	Bran and shorts -----	Newport Milling Co., Newport, Tenn. -----
212 M	Shipstuff -----	Goldstone Milling Co., Goldstone, N. C. -----
198 M	Mill feed -----	Carolina Roller Mills, Durham, N. C. -----
208 M	---do -----	Harman De Randeau, Crimora, Va. -----
136 M	Mixed feed -----	J. A. Meadows, New Bern, N. C. -----
55 M	Feed -----	L. Lee, Raleigh, N. C. -----
95 M	---do -----	Stevens City Milling Co., Stevens City, Va. -----
94 M	---do -----	J. H. Walker, Reidsville, N. C. -----
125 M	Chicken Lice Powder, Prussian -----	-----
127 M	Feed -----	Raleigh Milling Co., Raleigh, N. C. -----
123 M	Molasses Feed -----	-----
122 M	Feed -----	Wachovia Mills, Winston, N. C. -----
112 M	Shipstuff -----	Harrisonburg Milling Co., Harrisonburg, Va. -----
199 M	---do -----	S. F. Beveridge & Co., Richmond, Va. -----
207 M	---do -----	S. G. Fairbanks, Richmond, Va. -----
133 M	Bran -----	J. D. Manor & Co., New Market, Va. -----
168 M	---do -----	Brown Bros., Marion, N. C. -----
184 M	---do -----	Atlas Flour Mills, Milwaukee, Wis. -----

NATION.—CONTINUED.

Laboratory Number.	Retail Dealer.	Date of Collection.	Ingredients.
131 M	W. A. Myatt, Raleigh, N. C.-----	July 11, '07	Wheat and corn product.
121 M	C. A. Norris & Co., Raleigh, N. C.-----	Apr. 24, '07	do.
120 M	McComb Bros., Hickory, N. C.-----	Apr. 10, '07	do.
119 M	Whittlock & Morrison, Rockingham, N. C.----	Mar. 30, '07	do.
74 M	McComb Bros., Hickory, N. C.-----	Dec. 10, '06	do.
113 M	W. A. Lucas, Wadesboro, N. C.-----	Apr. 1, '07	Wheat product.
92 M	C. D. Shelby & Bro., Charlotte, N. C.-----	Dec. 17, '06	do.
101 M	Phillips & Penny, Raleigh, N. C.-----	Apr. 24, '07	do.
169 M	J. E. Fain, Murphy, N. C.-----		do.
137 M	The Worth Co., Wilmington, N. C.-----	July 22, '07	do.
138 M	D. L. Gore, Wilmington, N. C.-----	July 22, '07	do.
170 M	J. E. Fain, Murphy, N. C.-----		do.
179 M	C. V. Williams, Hamlet, N. C.-----	Sept. 24, '07	do.
132 M	Hunter & Dunn, Raleigh, N. C.-----	July 11, '07	do.
93 M	Parham Bros., Henderson, N. C.-----	Nov. 24, '07	do.
71 M	Hunter & Dunn, Raleigh, N. C.-----	Dec. 5, '06	Wheat bran and corn bran.
98 M	Griffin & Parham, Gastonia, N. C.-----	Jan. 16, '07	Wheat product.
70 M	Johnstone Bros., Charlotte, N. C.-----	Dec. 17, '06	do.
78 M	Kluttz & Rendleman, Salisbury, N. C.-----	Dec. 19, '06	Wheat bran and corn bran.
212 M	Wilkins, Ricks & Co., Sanford, N. C.-----	Sept. 30, '07	Wheat product.
198 M	A. J. Bynum & Sons, Pittsboro, N. C.-----	Sept. 28, '07	Wheat and corn product.
208 M	Lambert & Crutchfield, Moncure, N. C.-----	Sept. 30, '07	Wheat product.
136 M	J. A. Meadows, New Bern, N. C.-----	July 19, '97	Wheat, corn and oat product.
55 M	-----		Wheat product.
95 M	Burns & Coleman Co., Henderson, N. C.-----	Nov. 24, '06	do.
94 M	P. R. Lamb & Co., Winston, N. C.-----	Dec. 21, '06	Wheat and corn bran.
125 M	W. L. Saunders, Durham, N. C.-----		Mostly naphtholene flakes.
127 M	Carolina Feed Store, Raleigh, N. C.-----		Mostly a corn product.
123 M	J. H. Houser, Charlotte, N. C.-----		Mostly barley and molasses.
122 M	James W. Fulp, Rural Hall, N. C.-----	Mar. 28, '07	Wheat and corn product.
112 M	H. D. Baldwin, Rockingham, N. C.-----		Wheat product.
199 M	L. W. Womble, Pittsboro, N. C.-----		do.
207 M	Womble Bros., Moncure, N. C.-----	Oct. 28, '07	do.
133 M	George Marsh & Co., Raleigh, N. C.-----		do.
168 M	Brown Grocery Co., Marion, N. C.-----	Sept. 7, '07	do.
184 M	Adams Grain and Provision Co., Maxton, N. C.	Sept. 25, '07	do.

MICROSCOPIC EXAM

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
201 M	Shipstuff -----	J. M. McIver, Gulf, N. C. -----
129 M	----do -----	Andrew Bowling, Staunton, Va. -----
130 M	----do -----	Cumberland Mills, Nashville, Tenn. -----
139 M	Corn Bran -----	Wilson Grocery Co., Wilson, N. C. -----
186 M	Middlings -----	C. A. Gambrill Manufacturing Co., Baltimore, Md. -----
202 M	Bran and Shorts -----	W. F. Green, Richmond, Va. -----
96 M	Corn Chops -----	-----

The inspection of the above table will reveal the components of these feeds.

NATION.—CONTINUED.

Laboratory Number.	Retail Dealer.	Date of Collection.	Ingredients.
201 M	J. H. Monger, Sanford, N. C. -----	Sept. 30, '07	Wheat product.
129 M	Crowder & Rand, Raleigh, N. C. -----	July 11, '07	do.
130 M	Phillips & Penny, Raleigh, N. C. -----	July 11, '07	do.
139 M	Wilson Grocery Co., Wilson, N. C. -----	July 24, '07	Corn bran.
186 M	Townsend & Thomas, Red Springs, N. C. -----	Sept. 25, '07	Wheat product.
202 M	Sanford Supply Co., Sanford, N. C. -----	Sept. 30, '07	do.
96 M	Standard Feed and Seed Co., Winston, N. C. --	Dec. 21, '06	Corn product.

ADULTERANTS.

When mixed with other good feeding materials without proper labeling or guarantee to indicate their presence, corn bran, rice chaff, ground corn-cobs, peanut hulls, peanut middlings, oat hulls, oat dust, mill sweepings, screenings, cotton-seed hulls, and other similar products are adulterants. The tables containing the chemical and microscopic examinations show that these adulterants were used to a considerable extent in the make-up of the feeds sold for stock in the State prior to the enforcement of the present feed law. To convey an idea of the real feeding value of these adulterants the following analyses were made:

	Per Cent Protein.	Per Cent Fat.	Per Cent Ash.	Per Cent Fiber.
Peanut hulls -----	4.56	.81	2.17	67.31
Peanut middlings -----	8.75	.88	16.75	40.75
Ground corn-cobs -----	3.12	.32	2.19	30.37
Rice chaff -----	2.50	.31	18.37	31.40
Oat hulls -----	3.03	1.06	6.70	29.07
Oat dust -----	8.09	5.01	6.09	1.82
Wheat screenings -----	9.08	2.02	2.90	3.00
Corn bran -----	9.00	5.08	1.30	12.70
Cotton-seed hulls -----	4.75	1.59	3.20	40.54

SUMMARY.

Wheat Bran.—Seventy-two (72) samples of bran were examined. Sixty-eight (68) were pure-wheat products. Four samples were branded bran or wheat bran, but were mixtures of wheat bran and corn bran.

Mixed Brans.—Thirteen (13) samples of mixed brans were examined. These are mixtures of wheat and corn bran.

Middlings.—Sixty-three (63) samples of middlings were examined and all were found to be pure-wheat products.

Bran and Shorts.—Nineteen (19) samples of bran and shorts were examined, and all were found to be pure-wheat products.

Brown Shorts.—Four (4) samples of brown shorts were examined. Two were entire wheat products and two samples were mixtures of wheat and corn products.

Shipstuff.—Sixty-five (65) samples of shipstuff were examined. Forty-six (46) were pure-wheat products and nineteen (19) were mixtures of wheat and corn products.

Corn and Oat Feeds.—Eighteen (18) samples of corn and oat feeds were examined. These are low-grade feeds, containing less than ten per cent. protein.

Rice Feeds.—Sixteen (16) samples of rice feeds were examined. These feeds vary very much in composition, and should be purchased according to the analysis they bear.

Molasses Feeds.—Thirty-nine (39) samples of molasses or sugar feeds were examined. These feeds are composed of different materials and consequently vary in quality.

Beet Pulp.—Six (6) samples of beet pulp were examined. Four samples were not up to their guarantee.

Hominy Feeds and Chops.—Thirty-eight (38) samples of chops, hominy meals and feeds were examined. An inspection of the analyses of these feeds will reveal their true quality.

Cotton-Seed Feeds.—Twenty-one (21) samples of cotton-seed feeds were examined. These feeds are of good quality, and up to their guaranteed analysis.

Special Mixed Feeds.—Thirteen (13) samples of special-named feeds were examined. The analyses of these feeds indicate their quality.

Meat Feeds.—Three (3) samples of meat feeds were examined and found to be up to their guaranteed analysis.

Miscellaneous Feeds.—Sixty-five (65) samples of miscellaneous feeds were examined. A critical examination of the analyses of these feeds will reveal their true quality.

Miscellaneous Feeds Examined Microscopically.—One hundred and fifty-one (151) samples of feeds were examined microscopically. An examination of the table marked "Ingredients" will show the material of which these feeds are composed.

Cotton-Seed Meals.—One hundred and five (105) samples of cotton-seed meals were examined. Forty per cent. were found to contain less than $7\frac{1}{2}$ per cent. of ammonia.

INSPECTION AND ANALYSES OF COTTON-SEED MEAL.

The cotton-seed meal law of this State requires that all cotton-seed meal sold in this State shall contain $7\frac{1}{2}$ per cent ammonia or more. One hundred and five (105) samples of cotton-seed meals have been examined. The samples have been secured from different parts of the State, at different times, and represent the quality of this product that is offered for sale in this State. Forty-three (43) of the samples examined, or 40 per cent, were below the standard of $7\frac{1}{2}$ per cent ammonia. Those samples below $7\frac{1}{2}$ per cent ammonia appear in black type.

Laboratory Number.	Name and Address of Manufacturer.	Name and Address of Retail Dealer.
2127	Battleboro Oil Co., Battleboro, N. C. -----	Sent in by mill -----
2130	----do -----	----do -----
2134	----do -----	----do -----
2138	----do -----	----do -----
2139	----do -----	----do -----
2148	----do -----	----do -----
2149	----do -----	----do -----
2176	----do -----	----do -----
2177	----do -----	----do -----
2178	----do -----	----do -----
2236	----do -----	----do -----
2237	----do -----	----do -----
2161	Bragaw, Williams & Co., Washington, N. C.-----	Wm. Bragaw & Co., Washington, N. C.-----
2105	Clayton Oil Mill, Clayton, N. C. -----	Clayton Oil Mill, Clayton, N. C. -----
2142	----do -----	Sent in by mill -----
2165	----do -----	----do -----
2158	Consumers Cotton Oil Co., Tarboro, N. C.-----	N. G. Grandy & Co., Elizabeth City, N. C. -----
2115	Conyers Oil Co., Conyers, Ga. -----	J. L. Smathers & Co., Murphy, N. C. -----
2186	Cotton Oil and Ginning Co., Scotland Neck, N. C. -----	In Box Car, Scotland Neck, N. C. -----
2189	----do -----	Sent in by mill -----
2190	----do -----	----do -----
2204	----do -----	R. J. Madrey, Scotland Neck, N. C. -----
2214	----do -----	----do -----
2150	Eastern Cotton Oil Co., Hertford, N. C.-----	Sent in by mill -----
2162	----do -----	W. R. Capehart, Avoca, N. C.-----
2188	----do -----	Cross & Co., Sunbury, N. C.-----
2230	----do -----	C. W. Spruill, Edenton, N. C. -----
2264	Edgecombe Oil Co., Tarboro, N. C.-----	A. J. Parker, Spead, N. C. -----
2194	Elba Manufacturing Co., Charlotte, N. C. -----	J. V. Pate, Laurel Hill, N. C. -----
2229	----do -----	Stanley Supply Co., Albemarle, N. C.-----
2116	----do -----	J. C. Bennett, Waynesville, N. C.-----
2212	Farmer's Cotton Oil Co., Wilson, N. C.-----	Tomlinson & Co., Wilson, N. C. -----
2213	----do -----	Wells Grocery Co., Wilson, N. C.-----
2128	Farmer's Oil Mill Co., Nashville, N. C.-----	Sent in by mill -----
2129	Farmers Oil Mill Co., Nashville, N. C. -----	Sent in by mill -----
2163	Fremont Oil Mill Co., Fremont, N. C.-----	----do -----
2173	----do -----	Sampled at the mill -----

COTTON-SEED MEAL.

Laboratory Number.	Where Sampled.	Date of Collection.	Per cent Ammonia Guaranteed.	Per cent Ammonia Found.	Per cent Protein Found.	Remarks.
2127	Battleboro -----	Jan. 18, '07		7.36	37.90	
2130	----do -----	Jan. 8, '97		7.10	36.56	
2134	----do -----	Dec. 18, '07		7.32	37.69	
2138	----do -----	Jan. 28, '07		7.36	37.90	
2139	----do -----	Jan. 28, '07		7.94	40.89	
2148	----do -----	Feb. 11, '07		8.08	41.62	
2149	----do -----	Feb. 11, '07		8.06	41.50	
2176	----do -----	Mar. 18, '07		8.02	41.30	
2177	----do -----	Mar. 18, '07		7.52	38.82	
2178	----do -----	Mar. 18, '07		7.54	38.83	
2236	----do -----	April 16, '07		7.92	40.78	
2237	----do -----	April 29, '07		7.62	39.24	
2161	Washington -----	Feb. 7, '07	7.50	7.72	39.75	
2105	Clayton -----	Oct. 24, '06		7.89	40.93	
2142	----do -----	Jan. 28, '07		7.64	39.34	
2165	----do -----	March '07		7.84	40.37	
2158	Elizabeth City -----	July 19, '07	7.50	7.62	39.24	
2115	Murphy -----	Oct. 24, '06	7.50	8.05	41.45	
2186	Scotland Neck -----	Feb. 9, '07	7.50	7.54	38.83	
2189	----do -----	March '07		7.76	39.96	
2190	----do -----	March '07		7.52	38.82	
2204	----do -----	Mar. 15, '07	7.50	7.06	36.35	
2214	----do -----	Mar. 15, '07	7.50	7.72	39.75	
2150	Hertford -----	Feb. '07	7.50	7.30	37.59	
2162	Edenton -----	Feb. 15, '07	7.50	6.98	35.94	
2188	Sunbury -----	Mar. 6, '07	7.50	7.06	36.35	
2230	Edenton -----	Mar. 21, '07	7.50	6.76	34.81	
2264	Spead -----	April 27, '07	7.50	6.76	34.81	
2194	Laurel Hill -----	Mar. 8, '07	7.50	7.60	39.14	
2229	Albemarle -----	April 3, '07	7.50	8.08	41.62	
2116	Waynesville -----	Oct. 23, '06	7.50	7.32	37.69	
2212	Wilson -----	Mar. 3, '07	7.50	8.18	42.12	
2213	----do -----	Mar. 20, '07	7.50	7.88	40.58	
2128	Nashville -----	Jan. 8, '07		7.82	40.27	
2129	Nashville -----	Jan. 8, '07	7.50	7.56	38.23	
2163	Fremont -----	Feb. 25, '07		8.06	41.50	
2173	----do -----	Feb. 25, '07	7.50	7.90	40.98	

ANALYSES OF COTTON-

Laboratory Number.	Name and Address of Manufacturer.	Name and Address of Retail Dealer.
2250	Fremont Oil Mill Co., Fremont, N. C.	Blount & Bro., Bethel, N. C.
2256	Georgia Cotton Oil Co., Atlanta, Ga.	R. H. Hyatt & Co., Murphy, N. C.
2255	Greensboro Cotton Oil Co., Greensboro, Ala.	Hickory Milling Co., Hickory, N. C.
2257	do	J. H. Pearson, Morganton, N. C.
2258	do	Davis & Hollingsworth, Mt. Airy, N. C.
2159	Havens Oil Co., Washington, N. C.	H. C. Privatt, Edenton, N. C.
2209	do	E. K. Willis, Washington, N. C.
2172	Henderson Cotton Oil Co., Henderson, N. C.	C. R. Emery & Co., Weldon, N. C.
2169	Humphreys, Godwin & Co., Memphis, Tenn.	F. T. Phillips, Washington, N. C.
2195	do	G. B. Curtis & Co., Enfield, N. C.
2274	do	do
2155	Kershaw Oil Mill Co., Kershaw, S. C.	J. H. Jenkins, Asheville, N. C.
2184	Laurinburg Oil Co., Laurinburg, N. C.	J. W. Carter, Maxton, N. C.
2203	do	D. T. Wright, Old Hundred, N. C.
2200	do	M. Wallace, Sardis, N. C.
2107	Lenoir Oil and Ice Co., Kinston, N. C.	Sent in by mill
2146	do	do
2131	do	do
2270	Lorena Cotton Oil Mills, Mooresville, N. C.	J. W. Brown, Mooresville, N. C.
2228	Louisburg Oil Mills, Louisburg, N. C.	Sent in by mill
2197	Lumberton Cotton Oil Co., Lumberton, N. C.	The Hardison Co., Wadesboro, N. C.
2273	do	J. W. McLauchlin & Co., Raeford, N. C.
2104	Morgan Oil and Fertilizer Co., Red Springs, N. C.	Sent in by mill
2170	New Bern Cotton Oil and Fertilizer Co., New Bern, N. C.	The Burrus and Gray Co., New Bern, N. C.
2210	do	C. P. Hill, New Bern, N. C.
2198	North Carolina Cotton Oil Co., Henderson, N. C.	Youngsville Supply Co., Youngsville, N. C.
2252	do	S. D. Hancock, Weldon, N. C.
2207	North Carolina Cotton Oil Co., Raleigh, N. C.	W. C. Brewer & Co., Wake Forest, N. C.
2284	do	Sent in by mill
2152	do	Y. H. Knowles, Mt. Olive, N. C.
2168	do	W. B. Cooper, Wilmington, N. C.
2196	North Carolina Cotton Oil Co., Raleigh, N. C.	W. F. Parker, Enfield, N. C.
2220	do	A. L. Causee, Mt. Tabor, N. C.
2234	do	W. R. Brown, Kelford, N. C.
2133	do	W. J. Wright, Ingold, N. C.
2260	Pauline Oil Mill, Glenn Springs, S. C.	Sladen, Fakes & Co., Asheville, N. C.
2124	Pine Level Oil Mill Co., Pine Level, N. C.	Sent in by mill

SEED MEAL.—CONTINUED.

Laboratory Number.	Where Sampled.	Date of Collection.	Per cent Ammonia Guaranteed.	Per cent Ammonia Found.	Per cent Protein Found.	Remarks.
2250	Bethel-----	Apr. 11, '07	7.50	7.62	39.24	
2256	Murphy-----	Apr. 12, '07	7.50	7.34	37.79	
2255	Hickory-----	Apr. 10, '07	7.50	8.04	41.90	
2257	Morganton-----	Mar. 10, '07	7.50	7.86	40.47	
2258	Mt. Airy-----	Mar. 19, '07	7.50	7.66	39.44	
2159	Edenton-----	Jan. 21, '06	7.54	8.02	41.30	
2209	Washington-----	Mar. 3, '07	7.50	7.66	39.44	
2172	Weldon-----	Feb. 23, -----		7.32	37.69	
2169	Washington-----	Feb. 7, -----	7.50	7.12	36.96	
2195	Enfield-----	Feb. 13, '07	7.50	7.72	39.75	
2274	----do-----	May 4, '07	7.50	8.00	41.20	
2155	Asheville-----	Dec. 14, '06	7.50	7.56	38.93	
2184	Maxton-----	Mar. 6, '07	7.50	8.66	44.59	
2203	Old Hundred-----	Feb. 26, '07-----		7.46	38.41	
2200	Sardis-----	Mar. 16, '07	7.50	7.44	38.31	
2107	Kinston-----	Oct. 23, '06-----		7.02	36.15	
2146	----do-----	Jan. 30, '06-----		7.62	39.24	
2131	----do-----	Jan. 11, '07-----		8.24	42.43	
2270	Mooresville-----	Apr. 30, '07	7.50	7.98	41.09	
2228	Louisburg-----	Apr. 16, '07-----		7.94	40.89	
2197	Wadesboro-----	Mar. 15, '07	7.50	7.18	36.97	
2273	Raeford-----	Apr. 15, '07	7.50	7.50	38.62	
2104	Red Springs-----	Oct. 24, '06-----		7.32	37.69	
2170	New Berne-----	Feb. 9, '07	7.50	7.98	41.09	
2210	----do-----	Mar. 19, '07	7.50	7.58	39.03	
2193	Youngsville-----	Mar. 15, '07	7.50	7.12	36.96	
2252	Weldon-----	Apr. 19, '07	7.50	7.24	37.28	
2207	Wake Forest-----	Mar. 16, '07	7.50	6.84	35.22	
2234	Raleigh-----	Aug. 26, '07-----		7.42	38.21	
2152	Mt. Olive-----	Dec. 15, '06	7.50	7.56	39.93	
2168	Wilmington-----	Feb. 2, '07	7.50	7.18	36.97	
2196	Enfield-----	Mar. 13, '07	7.50	7.16	36.87	
2220	Mount Tabor-----	Mar. 28, '07	7.50	7.02	36.15	
2234	Kelford-----	Mar. 27, '07	7.50	6.96	35.84	
2133	Ingold-----	Jan. 7, '07	7.50	6.70	34.50	
2260	Asheville-----	April 11, '07	7.50	7.94	40.89	
2124	-----	Dec. 24, -----		7.75	39.91	

ANALYSES OF COTTON-

Laboratory Number.	Name and Address of Manufacturer.		Name and Address of Retail Dealer.	
2187	Pine Tops Oil and Guano Co., Pine Tops, N. C.		W. L. Reason, Pine Tops, N. C.	
2122	Rowland Oil and Fertilizer Co., Rowland, N. C.		Sent in by mill	
2126	do		do	
2248	Southern Cotton Oil Co., Charlotte, N. C.		W. A. Myatt, Raleigh, N. C.	
2238	do		do	
2114	do		R. S. Abernethy, Lincolnton, N. C.	
2192	Southern Cotton Oil Co., Conetoe, N. C.		Morrison Bros. & Co., Williamston, N. C.	
2199	Southern Cotton Oil Co., Fayetteville, N. C.		J. F. Bostic, Red Springs, N. C.	
2151	Southern Cotton Oil Co., Goldsboro, N. C.		Best & Thompson, Goldsboro, N. C.	
2232	do		Stephenson & Sykes, Pendleton, N. C.	
2171	do		H. Weil & Bros., Goldsboro, N. C.	
2249	do		do	
2206	do		E. J. Martin Sons & Co., Mt. Olive, N. C.	
2191	do		Baker & Salisling, Edenton, N. C.	
2205	Southern Cotton Oil Co., Monroe, N. C.		Collins & Biggers, Monroe, N. C.	
2233	Southern Cotton Oil Co., Tarboro, N. C.		Baker & Roberson, Palmyra, N. C.	
2160	do		J. V. Johnson, Greenville, N. C.	
2185	Southern Cotton Oil Co., Wilson, N. C.		Sharpsburg Supply Co., Sharpsburg, N. C.	
2164	do		B. C. Pittman, Whitakers, N. C.	
2251	South Atlantic Oil Co., Wadesboro, N. C.		T. N. Hardison, Marvin, N. C.	
2106	Spring Hope Cotton Oil Co., Spring Hope, N. C.		Sent in by mill	
2153	Statesville Oil and Fertilizer Co., Statesville, N. C.		J. L. Cowan, Statesville, N. C.	
2272	do		Standard Feed and Seed Co., Winston, N. C.	
2221	do		Grimes Bros., Lexington, N. C.	
2154	Victor Cotton Oil Co., Gaffney, S. C.		J. B. Schochett, Asheville, N. C.	
2243	J. Lindsay Wells Co., Memphis, Tenn.		J. E. Fain, Murphy, N. C.	
2244	do		do	
2271	do		R. J. Madrey, Scotland Neck, N. C.	
2215	do		do	
2259	do		Sladen Fakes & Co., Asheville, N. C.	
2179	do		R. J. Madrey, Scotland Neck, N. C.	

DISCUSSION OF RESULTS.

Good grades of cotton-seed meal contain 43 per cent. or more of protein.

SEED MEAL.—CONTINUED.

Laboratory Number.	Where Sampled.	Date of Collection.	Per cent Ammonia Guaranteed.	Per cent Ammonia Found.	Per cent Protein Found.	Remarks.
2187	Pine Tops -----	Feb. 8, '07	7.50	7.44	38.31	
2122	Rowland-----	Dec. 7, '06		6.92	35.63	
2126	----do-----	Jan. 5, '07		7.72	39.75	
2248	Raleigh-----	Mar. 24, '07	7.50	7.76	39.96	
2238	----do-----	Apr. 18, '07	7.50	7.66	39.44	
2114	Lincolnton-----	Nov. 16, '06	7.50	7.18	36.97	
2192	Williamston-----	Mar. 11, '07	7.50	7.52	38.82	
2199	Red Springs-----	Mar. 13, '07	7.50	7.23	37.23	
2151	Goldsboro-----	Dec. 15, '06	7.50	8.00	41.20	
2232	Kelford-----	Mar. 27, '07	7.50	7.16	36.87	
2171	Goldsboro-----	Feb. 18, '07	7.50	7.46	38.47	
2249	----do-----	Apr. 11, '07	7.50	7.30	37.59	
2206	Mount Olive-----	Mar. 6, '07	7.50	7.20	37.08	
2191	Edenton-----	Feb. 28, '07	7.50	7.10	36.56	
2205	Monroe-----	Mar. 20, '07	7.50	7.28	37.49	
2233	Palmyra-----	Mar. 27, '07	7.50	7.64	39.34	
2160	Greenville-----	Jan. 23, '07	7.50	7.70	39.95	
2185	Sharpsburg-----	Mar. 11, '07	7.50	7.38	38.00	
2164	Whitakers-----	Feb. 18, '07	7.50	7.16	36.87	
2251	Marvin-----	Apr. 12, '07	7.50	7.66	39.44	
2106	Spring Hope-----	Oct. 22, '06		7.95	40.94	
2153	Statesville-----	Dec. 10, '06	7.50	8.00	41.20	
2272	Winston-----	Apr. 4, '00	7.50	7.60	39.14	
2221	Lexington-----	Mar. 26, '07	7.50	7.82	40.27	
2154	Asheville-----	Dec. 14, '06	7.50	7.33	38.00	
2243	Murphy-----	Apr. 12, '07	7.50	7.26	39.96	
2244	----do-----	Apr. 12, '07	7.50	7.26	37.38	
2271	Scotland Neck-----	Apr. 10, '07	7.50	7.68	39.55	
2215	----do-----	Mar. 2, '07	8.00	7.50	38.62	
2259	Asheville-----	Apr. 11, '07	8.00	7.58	39.03	
2179	Scotland Neck-----	Feb. 9, '07	8.00	7.66	39.44	

This means that they have about 7 per cent. of nitrogen, which is equal to 8.50 per cent. of ammonia. Meals in past years especially have not infrequently been considerably higher than this.

INSPECTION AND ANALYSIS OF COTTON-SEED MEAL.

AN ACT TO REGULATE THE SALE AND INSPECTION OF COTTON-SEED MEAL.

[Chapter 267, Laws 1905.]

The General Assembly of North Carolina do enact:

SECTION 1. That chapter three hundred and thirty-nine (339) of the Public Laws of one thousand nine hundred and three (1903), entitled "An act to regulate the sale, inspection and branding of cotton-seed meal," be amended so as to read as follows:

SEC. 2. That all cotton-seed meal sold for use as fertilizer or feed shall be subject to an inspection tax of twenty cents per ton, and be subject to inspection, as other fertilizers or fertilizing materials, unless sold to manufacturers for use in manufacturing fertilizers.

SEC. 3. That all cotton-seed meal offered for sale, unless sold to manufacturers for use in manufacturing fertilizers, shall have plainly branded on the bag containing it, or on a tag attached thereto, the following data:

1. Cotton-seed meal with brand.
2. Weight of package.
3. Ammonia or nitrogen.
4. Name and address of manufacturer.

SEC. 4. That no person or persons, firm or corporation shall offer for sale any cotton-seed meal, except as provided in section three of this act, with a minimum per cent of ammonia of less than seven and one-half ($7\frac{1}{2}$) per cent. Meal containing seven and one-half ($7\frac{1}{2}$) per cent or more of ammonia is standard meal, and may be so branded. Meal containing eight (8) per cent or more of ammonia is high-grade meal, and may be so branded.

SEC. 5. That the State Board of Agriculture is empowered and directed to make such rules and regulations as are necessary to a proper carrying into effect the provisions of this act, and to provide for all such tags as manufacturers may demand, upon paying the tax therefor. Any person wilfully violating any of the regulations made by the Board of Agriculture in connection with this act shall be guilty of a misdemeanor. Any person or persons, firm or corporation who shall sell or offer for sale any cotton-seed meal without having the proper tax tags attached thereto, or who shall use the required tags the second time to avoid the payment of the tonnage charge, and every person who shall remove any such meal, shall be liable to a penalty of ten dollars (\$10) for each separate bag, barrel or other package sold or offered for sale or removed, to be recovered by any person who may sue for the same.

SEC. 6. That any person or persons, firm or corporation who shall sell or offer for sale any cotton-seed meal contrary to the provisions above set forth shall be guilty of a misdemeanor, and all cotton-seed meal so sold or offered for sale shall be subject to seizure, condemnation and sale by the Commissioner of Agriculture. Such seizure and sale shall be made under the direction of the Commissioner of Agriculture by an officer or agent of the department; the sale to be made at the court-house door in the county in which the seizure is made, after thirty (30) days' advertisement in some newspaper

published in said county, or if no newspaper is published in said county, then by like advertisement in a newspaper published in the nearest county thereto having a newspaper. The advertisement shall state the grade of the meal, the quantity, why seized and offered for sale.

The Commissioner, however, shall have the discretion to release the meal so seized and condemned upon compliance with the law as set forth above and the payment of all costs and expenses incurred by the department in any proceedings connected therewith. The net proceeds from such sale shall be placed in the general fund of the department and accounted for upon its books.

SEC. 7. Whenever the Commissioner of Agriculture shall be satisfied that any cotton-seed meal is essentially below the guaranteed analysis it shall be his duty to assess said deficiency against the manufacturer of the meal and require that the value of said deficiency be made good to all persons who, in the opinion of the Commissioner, have purchased the said meal; and the Commissioner may seize any meal belonging to said company, to the value of the deficiency, if the deficiency shall not be paid within thirty (30) days after notice to the company. If the Commissioner shall be satisfied that the deficiency in analysis was due to intention or fraud of the manufacturer, then the Commissioner shall assess and collect from the manufacturer twice the amount of the deficiency and pay over the same to parties who purchased said meal. That if any manufacturer shall resist such collection or payment the Commissioner shall immediately publish the analysis and the facts in THE BULLETIN and in such newspapers in the State as he may deem necessary.

SEC. 8. It shall be unlawful for any manufacturer to adulterate cotton-seed meal in the process of manufacture or otherwise.

SEC. 9. This act shall be in force from and after July first, nineteen hundred and five (1905).

In the General Assembly read three times, and ratified this the 17th day of February, A. D. 1906.

**REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH OF
NOVEMBER, 1907.**

Pounds sold for producers, first hand.....	20,629,943
Pounds sold for dealers.....	350,795
Pounds resold for warehouse.....	870,077
Pounds resold for other warehouses.....	8,101
Total	<hr/> 21,859,516

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

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GARDEN

EIGHTH REPORT

ON

FOOD ADULTERATION

UNDER THE PURE FOOD LAW

DECEMBER, 1907

THIS BULLETIN IS SENT FREE TO RESIDENTS OF THE STATE ON APPLICATION

STATE BOARD OF AGRICULTURE.

S. L. PATTERSON, Commissioner, *ex officio* Chairman, Raleigh.

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THE BULLETIN.

VOLUME 28.

NORTH CAROLINA STATE BOARD OF AGRICULTURE.

NUMBER 12.

Entered at the Raleigh Post-office as second-class mail matter.
THE BULLETIN is published monthly by the State Board of Agriculture.

RALEIGH, DECEMBER, 1907.

REPORT ON FOOD PRODUCTS FOR 1907.

B. W. KILGORE, STATE CHEMIST,

BY

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ASSISTED BY MISS H. M. CARD.

A general statement, a summary of the work for the eight years, and the results of the examination of food products for the year 1907, which is the eighth annual report under the Food Law, are presented on the following pages.

GENERAL STATEMENT.

When of general interest, analyses will be made for parties within the State, if samples are taken in accordance with instructions furnished by the Department and the required data concerning the samples are given.

Results of analyses are sent to parties sending samples and parties from whom samples are obtained by the Department, as well as the manufacturer of the products.

It is the desire of the Department to put information into the hands of manufacturers, dealers, and consumers of food, and to assist them in every way it can to know and manufacture, handle and use the best, most desirable and most wholesome food products. The Food Control is in the interest of the honest manufacturer, the honest dealer, and for the protection of the consumer.

SUMMARY OF RESULTS FOR COMPARISON.

For convenience of comparison of the work for the eight years, and to show at a glance the products which have been examined, and the extent of adulteration of each, a summary of the results by year and by subject is given below.

SUMMARY OF WORK DONE BY YEAR.

1900.	No. of samples examined, 507; per cent adulteration found, 56.0
1901.	No. of samples examined, 308; per cent adulteration found, 35.7
1902.	No. of samples examined, 589; per cent adulteration found, 21.3
1903.	No. of samples examined, 477; per cent adulteration found, 32.1
1904.	No. of samples examined, 347; per cent adulteration found, 17.0
1905.	No. of samples examined, 317; per cent adulteration found, 42.2
1906.	No. of samples examined, 466; per cent adulteration found, 24.7
1907.	No. of samples examined, 560; per cent adulteration found, 29.82

Total number of samples examined since the law went into effect (1900), 3,571.

Average per cent of adulteration found, 30.99.

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per cent Adulteration.</i>
Baking Powders	1901	85	18.80
Baking Powders	1902	12	
Baking Powders	1906	64	1.50
Beers—1900, 1902, etc. See Malts.			
Beers and Imitation Beers.....	1907	50	6.00
Breakfast Foods	1900	24	4.11
Breakfast Foods	1903	20	
Breakfast Foods	1904	39	
Butter, Renovated Butter and Butterine.....	1900	11	
Butter, Renovated Butter and Butterine.....	1902	22	
Butter, Renovated Butter and Butterine.....	1904	15	
Butter, Renovated Butter and Butterine.....	1906	20	
Canned Fruit:			
Apples	1902	2	
Apricots	1902	6	17.00
Apricots	1904	1	
Blackberries	1902	2	
Blackberries	1904	1	
Cherries	1902	3	33.33
Peaches	1902	14	21.50
Peaches	1904	1	
Pears	1902	7	8.60
Pears	1904	2	
Pineapple	1902	3	
Pineapple	1904	3	
Plums	1904	2	

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per cent Adulteration.</i>
Canned Fish and Oysters.....	1904	53	1.88
Canned Meats	1904	33	39.39
Canned Vegetables:			
Asparagus	1904	3	
Beans, baked	1900	8	100.00
Beans, baked	1904	3	33.33
Beans, Lima	1900	8	62.50
Beans, Lima	1904	3	
Beans, Snap	1900	9	77.77
Beans, Snap	1904	3	
Beets	1904	3	
Celery	1900	2	
Corn	1900	70	60.00
Corn	1902	56	34.00
Corn	1904	16	43.75
Corn	1905	29	
Corn and Tomatoes.....	1900	4	100.00
Okra	1900	2	50.00
Okra and Tomatoes.....	1900	8	100.00
Okra and Tomatoes.....	1904	3	33.33
Peas, Garden	1900	37	81.00
Peas, Garden	1904	6	17.00
Pumpkin	1900	8	50.00
Succotash	1900	14	7.14
Tomatoes	1900	55	63.63
Tomatoes	1902	25	24.00
Tomatoes	1904	7	
Canned Soups	1906	26	
Canned Soups	1907	4	
Catsups and Sauces.....	1900	43	91.61
Catsups and Sauces.....	1902	22	100.00
Catsups and Sauces.....	1903	49	100.00
Catsups and Sauces.....	1907	11	27.27
Ciders and Imitation Ciders.....	1900	3	100.00
Ciders and Imitation Ciders.....	1902	2	50.00
Ciders and Imitation Ciders.....	1903	1	100.00
Ciders and Imitation Ciders.....	1905	33	81.82
Cheese	1902	33	6.00
Cheese	1904	11	
Chocolate	1904	10	20.00
Cocoa	1904	14	
Coffee	1900	55	36.30
Coffee	1903	38	

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per cent Adulteration.</i>
Coffee and Coffee Substitutes.....	1907	6	33.33
Coloring Matter	1907	7	
Condensed Milk	1907	16	
Condiments	1901	44	20.40
Corn Meal	1902	17	
Corn Meal	1903	23	
Distilled Liquors	1903	3	
Distilled Liquors	1904	14	
Distilled Liquors	1906	28	
Distilled Liquors	1907	6	
Dried and Evaporated Fruit.....	1906	23	30.44
Fish and Oysters, fresh.....	1906	14	7.15
Fish and Oysters, fresh.....	1907	5	40.00
Flour	1900	37	
Flour	1902	70	1.40
Flour	1903	77	
Flour	1904	59	
Fruit Butter, Plum.....	1901	5	100.00
Fruit Butter, Apple.....	1903	1	100.00
Fruit Butter	1907	6	100.00
Fruit Juice	1900	4	75.00
Fruit Juice	1903	2	100.00
Honey	1901	5	20.00
Honey	1903	6	33.30
Honey	1906	3	
Jams	1901	9	100.00
Jams	1903	14	78.40
Jams	1907	14	28.56
Jellies	1901	10	100.00
Jellies	1903	14	76.60
Jellies	1907	50	48.00
Lard	1900	11	9.00
Lard	1902	32	3.10
Lard, Compound	1902	24	
Malts, Beers, Ales, and Imitations.....	1900	30	80.00
Malts, Beers, Ales, and Imitations.....	1902	3	100.00
Malts, Beers, Ales, and Imitations.....	1903	14	86.00
Malts, Beers, Ales, and Imitations.....	1905	17	47.00
Malts, Beers, Ales, and Imitations.....	1906	91	31.68
Malts and Imitation Malts.....	1907	5	20.00
Maraschino Cherries	1907	8	100.00
Meats, fresh	1904	12	83.33
Meats, fresh	1906	107	47.66
Meats, fresh	1907	134	7.46
Mince Meat	1907	9	27.22
Molasses and Syrup.....	1901	32	81.20
Molasses and Syrup.....	1903	11	37.50
Maple Sugar	1905	2	50.00

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per cent Adulteration.</i>
Maple Syrup	1905	15	86.66
Marmalade	1903	3	
Olive Oil and other Table Oils.....	1900	11	18.18
Olive Oil and other Table Oils.....	1905	14	
Phosphates	1902	6	100.00
Phosphates	1903	3	
Phosphates	1905	2	
Phosphates	1907	7	28.57
Pickles	1907	6	66.66
Prepared Mustard and Salad Dressings.....	1902	11	90.90
Prepared Mustard and Salad Dressings.....	1904	37	75.75
Prepared Mustard and Salad Dressings.....	1906	24	12.50
Preserves	1901	11	100.00
Preserves	1903	20	75.00
Preserves and Marmalades.....	1907	37	37.80
Soda Waters, Bottled.....	1900	33	72.72
Soda Waters, Bottled.....	1902	36	72.00
Soda Waters, Bottled.....	1903	20	25.00
Soda Waters, Bottled.....	1906	7	43.00
Soda Waters, Bottled	1907	54	61.05
Sugar, White	1901	19	
Sugar, Brown	1903	16	
Sugar, White	1903	29	
Tea	1901	25	
Tea	1903	21	33.33
Tapioca	1903	3	
Tonics and Bitters.....	1900	1	100.00
Tonics and Bitters.....	1902	3	33.33
Tonics and Bitters.....	1903	3	33.33
Tonics and Bitters.....	1905	14	7.14
Tonics and Bitters.....	1906	13	
Tonics	1907	4	
Vinegar	1900	22	59.00
Vinegar	1901	13	30.70
Vinegar	1903	62	29.00
Vinegar	1905	52	34.61
Vinegar	1906	21	47.62
Vinegar	1907	39	30.72
Whiskeys. See Distilled Liquors.			
Wines	1903	5	100.00
Wines	1905	1	100.00
Wines	1906	5	
Wines	1907	2	

WORK OF THE YEAR 1907.

During the year 560 samples of foods and beverages and products used in the manufacture and adulteration of the same have been analyzed. The samples were either sent to the Department by citizens of the State for analysis or were obtained by officers of the Department from various towns of the State.

SUMMARY OF RESULTS OF THE EXAMINATION OF FOOD PRODUCTS FOR 1907.

Name of Sample.	Total Number of Samples.	No Adulteration Found.	Adulterated.	Per Cent Adulteration.	Kind of Adulterant.
Meats-----	134	124	10	7.46	Boric acid.
Fish and oysters-----	5	3	2	40.00	Boric acid.
Mince meats-----	9	7	2	22.22	Benzoic acid.
Catsup and sauces-----	11	8	3	27.27	Coal-tar dyes, salicylic acid and sulphites.
Canned soups-----	4	4	-----	-----	-----
Condensed milk-----	16	16	-----	-----	-----
Baking powders-----	7	7	-----	-----	-----
Preserves and marmalades-----	37	23	14	37.80	Benzoic and salicylic acids, coal-tar dyes and sulphites.
Jams-----	14	10	4	28.56	Benzoic acid.
Jellies-----	50	26	24	48.00	Benzoic acid, sulphites, coal-tar dyes.
Fruit butters-----	6	-----	6	100.00	Coal-tar dye and benzoic acid.
Maraschino cherries-----	8	-----	8	100.00	Benzoic acid, coal-tar dyes and sulphites.
Ciders and imitation ciders-----	37	7	30	81.08	Benzoic acid, salicylic acid and coal-tar dyes.
Fruit juices and imitation fruit juices-----	5	3	2	40.00	Benzoic acid and coal-tar dyes.
Pickles-----	6	2	4	66.66	Benzoic acid and saccharine.
Vinegar-----	39	29	12	30.72	Spirit vinegar and water.
Coffee-----	6	4	2	33.33	Chicory and roasted cereals.
Phosphates-----	7	2	5	71.43	Benzoic acid and coal-tar dyes.
Soda waters-----	54	21	33	61.05	Benzoic and salicylic acids, saccharine and coal-tar dyes.
Coloring matter for foods-----	7	7	-----	-----	-----
Malts and imitation malts-----	5	4	1	20.00	Salicylic acid.
Beers and imitation beers-----	50	47	3	6.00	Salicylic acid and coal-tar dyes.
Wines-----	2	2	-----	-----	-----
Distilled liquors-----	6	4	2	33.33	Neutral spirits and water.
Tonics-----	4	4	-----	-----	-----
Preservatives, chemical-----	31	31	-----	-----	-----
Total-----	560	393	167	29.82	-----

METHODS OF ANALYSIS.

The methods of analysis of the Association of Official Agricultural Chemists were followed in the examination of the products presented in this report.

MEATS.

(MEATS, SAUSAGE, OYSTERS AND FISH.)

Meat is any clean, sound, dressed and properly prepared edible part of animals in good health at the time of slaughter. The term "animal," as herein used, includes not only mammals, but fish, fowls, crustaceans, mollusks and all other animals used as food.

Meat is adulterated if treated with any of the substances declared deleterious and dangerous to health by the State Food Law, or with any antiseptic or chemical preservative or dyestuff whose use and purpose are to retard, prevent or mask decomposition. In addition to the above, sausage shall be deemed adulterated if it is composed in any part of liver, lungs, kidneys or other *viscera* of animals, except the use of intestines as sausage casings.

The principal adulteration in meats is the use of chemical preservatives in them. This form of adulteration has been very largely practiced by the local meat dealers of the State, but, in justice to them, it must be said that they were not aware of the deleterious effect of these preservatives on health. Since the dealers have been informed that chemical preservatives in food are objectional and are in violation of the Food Law, they have largely discontinued the use of them on meats.

During last year (1906) an examination of the fresh meats sold in the State showed that 52 per cent of them were adulterated. During this year (1907) 134 samples obtained from the various towns of the State by an inspector of the Department have been examined, and only ten samples, or less than 7.5 per cent, were found to be adulterated. All of the ten samples adulterated contained boric acid.

One sample of sausage (No. 5152) contained starch, which would be classed as an adulterant had the presence of cereals, the source of the starch, not been stated in the label of the package. It was alleged, however, that the purchaser was not informed of the presence of the cereal; but, as the package was properly labeled and in plain view, it is claimed by the dealer that there was no intent to deceive.

FISH AND OYSTERS.

Under the head of meats, according to the standards, come fish and oysters.

Under the subhead of fish and oysters only five samples were examined—two of oysters and three of fish. The oysters were found to be free from adulteration.

The examination of the codfish was principally to see if boric acid used externally as a preservative would necessarily be removed by such treatment as is necessary to remove the salt present before the fish could be eaten.

The sample was tested and boric acid was found to be present. Another portion of the sample was soaked twelve hours in four times its weight of cold water. The water was poured off, the sample rinsed with fresh water and then boiled for twenty minutes in an

RESULTS OF THE EXAMINATION OF FRESH MEATS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4912	Sausage, mixed -----	D. F. Morgan, Smithfield, N. C.-----
4913	Sausage, pickled, Armour's-----	Armour Packing Co., Chicago, Ill. -----
4914	Beef-----	do -----
4915	Sausage, beef, smoked -----	S. Cohn & Son, Goldsboro, N. C.-----
4916	Pork-----	Swift & Co., Chicago, Ill.-----
4917	Pork, steak-----	-----
4918	Sausage, beef, smoked -----	-----
4919	Beef-----	Swift & Co., Chicago, Ill.-----
4920	Beefsteak -----	-----
4921	Tripe, pickled -----	Armour Packing Co., Chicago, Ill. -----
4922	Beef-----	do -----
4923	Mutton -----	do -----
4924	Beef, corned, cooked -----	Libby, McNeil & Libby, Chicago, Ill.-----
4925	Pigfeet, pickled -----	Armour Packing Co., Chicago, Ill. -----
4926	Pork, pickled-----	do -----
4927	Sausage, Bologna -----	do -----
4928	Veal-----	do -----
4929	Sausage, pork, Bologna -----	Goldman, Schweisheimer & Co., New York, N.Y.-----
4930	Bacon, Gold Band -----	Armour Packing Co., Chicago, Ill. -----
4931	Bacon, Busy Bee -----	Street & Corkran, Baltimore, Md.-----
4932	Sausage, Vienna -----	Armour Packing Co., Chicago, Ill. -----
4933	Beef-----	do -----
4934	Pork-----	do -----
4935	Liver, beef -----	Swift & Co., Chicago, Ill. -----
4936	Sausage -----	H. R. Bright, Washington, N. C.-----
4937	Beef-----	do -----
4938	do -----	O. Runly, Washington, N. C.-----
4939	Sausage -----	A. A. Nichols, Washington, N. C.-----
4940	Sausage, Bologna -----	Kingan & Co., Richmond, Va.-----
4941	Beef-----	-----
4942	Ham-----	Kingan & Co., Richmond, Va.-----
4945	do -----	Armour Packing Co., Chicago, Ill. -----
4946	Beef-----	J. Schwartz, Raleigh, N. C.-----

other quantity of water. The sample of fish was removed and the water evaporated. The residue was found to contain only a trace of boric acid.

AND SAUSAGE—NO ADULTERATION FOUND.

Laboratory Number.	Retail Dealer.	Adulterants (Chemical Preservatives).
4912	D. F. Morgan, Smithfield, N. C.-----	None found.
4913	Royal Grocery Co., Goldsboro, N. C. -----	do.
4914	----do -----	do.
4915	S. Cohn & Son, Goldsboro, N. C.-----	do.
4916	----do -----	do.
4917	----do -----	do.
4918	Henry N. Hall, Goldsboro, N. C. -----	do.
4919	----do -----	do.
4920	Coast Line Meat Market, New Bern, N. C. -----	do.
4921	Elite Market, Wilmington, N. C.-----	do.
4922	----do -----	do.
4923	----do -----	do.
4924	----do -----	do.
4925	----do -----	do.
4926	----do -----	do.
4927	----do -----	do.
4928	----do -----	do.
4929	----do -----	do.
4930	----do -----	do.
4931	----do -----	do.
4932	J. F. Garrell, Wilmington, N. C. -----	do.
4933	----do -----	do.
4934	----do -----	do.
4935	----do -----	do.
4936	H. R. Bright & Co., Washington, N. C.-----	do.
4937	----do -----	do.
4938	O. Runly, Washington, N. C.-----	do.
4939	A. A. Nichols, Washington, N. C.-----	do.
4940	----do -----	do.
4941	----do -----	do.
4942	----do -----	do.
4945	Thomas Donaldson, Raleigh, N. C. -----	do.
4946	J. Schwartz, Raleigh, N. C.-----	do.

RESULTS OF THE EXAMINATION OF FRESH MEATS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4948	Sausage-----	Young & Jones, Raleigh, N. C.-----
4949	Beef-----	do-----
4950	Sausage-----	Towns & Co., Raleigh, N. C.-----
4951	Beef-----	do-----
4952	Beefsteak-----	W. R. Crawford, Raleigh, N. C.-----
4953	Beef, chops-----	E. G. Richardson, Raleigh, N. C.-----
4954	Ham-----	Kingan & Co., Richmond, Va.-----
4955	Beef-----	Wash Shepherd, Raleigh, N. C.-----
4956	Bacon, breakfast-----	Kingan & Co., Richmond, Va.-----
4957	Sausage-----	Swift & Co., Chicago, Ill.-----
4958	Bacon, breakfast-----	do-----
4959	Fish, salt-----	Butler Bros.-----
4960	Beef-----	
4961	Mutton-----	
4962	Beef-----	Armour Packing Co., Chicago, Ill.-----
4963	Mutton-----	
4964	Bacon, breakfast-----	
4965	Ham, pork-----	
4966	Beef-----	
4967	Mutton-----	
4968	Pork-----	
4969	Ham-----	Street & Corkran, Baltimore, Md.-----
4971	Sausage, mixed-----	
4972	Beef-----	
4973	Sausage, mixed-----	
4974	Mutton, chops-----	Clements & Clements, Danville, Va.-----
4975	Beef-----	do-----
4977	Beef-----	
4978	Sausage-----	
4979	Beef-----	
4980	do-----	
5078	do-----	Stewart & Bumgardner, Mt. Airy, N. C.-----
5079	do-----	
5081	do-----	
5082	do-----	
5083	Veal-----	
5084	Ham-----	Armour Packing Co., Chicago, Ill.-----

AND SAUSAGE—NO ADULTERATION FOUND—CONTINUED.

Laboratory Number.	Retail Dealer.	Adulterants (Chemical Preservatives).
4948	Young & Jones, Raleigh, N. C.-----	None found.
4949	----do-----	do.
4950	Towns & Co., Raleigh, N. C.-----	do.
4951	do-----	do.
4952	W. R. Crawford, Raleigh, N. C.-----	do.
4953	E. G. Richardson, Raleigh, N. C.-----	do.
4954	----do-----	do.
4955	Wash Shepherd, Raleigh, N. C.-----	do.
4956	J. B. Green & Co., Raleigh, N. C.-----	do.
4957	Rogers Grocery Co., Raleigh, N. C.-----	do.
4958	----do-----	do.
4959	----do-----	do.
4960	Hudson Grocery Co., Greensboro, N. C.-----	do.
4961	----do-----	do.
4962	Jeffreys Meat Market, Greensboro, N. C.-----	do.
4963	Parlor Meat Market, Greensboro, N. C.-----	do.
4964	----do-----	do.
4965	----do-----	do.
4966	----do-----	do.
4967	Claude Pearce, Greensboro, N. C.-----	do.
4968	----do-----	do.
4969	----do-----	do.
4971	J. C. Olive, Greensboro, N. C.-----	do.
4972	----do-----	do.
4973	Andrew L. Schlosser & Son, Greensboro, N. C.-----	do.
4974	----do-----	do.
4975	----do-----	do.
4977	-----	do.
4978	-----	do.
4979	-----	do.
4980	-----	do.
5072	Stewart & Bumgardner, Mt. Airy, N. C.-----	do.
5079	J. P. Council, Mt. Airy, N. C.-----	do.
5081	Murphy's Meat Market, Mt. Airy, N. C.-----	do.
5082	M. L. Jackson, Salisbury, N. C.-----	do.
5083	----do-----	do.
5084	----do-----	do.

RESULTS OF THE EXAMINATION OF FRESH MEATS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
5085	Ham, Reliable-----	Kingan & Co., Richmond, Va.-----
5086	Beef-----	-----
5087	Veal-----	-----
5154	Beefsteak-----	-----
5088	Mutton-----	-----
5089	Pork-----	-----
5090	Sausage, mixed-----	-----
5091	Beef-----	-----
5097	Sausage, Weinerwurst-----	-----
5098	Veal-----	-----
5099	Mutton-----	-----
5100	Ham-----	Kingan & Co., Richmond, Va.-----
5101	Beef-----	-----
5102	Ham-----	-----
5103	Sausage, mixed-----	-----
5104	Beef-----	-----
5105	Sausage, mixed-----	-----
5106	Sausage, Weinerwurst-----	-----
5107	Tripe-----	-----
5108	Beef-----	Armour Packing Co., Chicago, Ill.-----
5109	Bacon, breakfast-----	Kingan & Co., Richmond, Va.-----
5110	----do-----	Street & Corkran, Baltimore, Md.-----
4618	Beef-----	Swift & Co., Richmond, Va.-----
4619	Mutton-----	----do-----
5111	Sausage, mixed-----	Star Market, Asheville, N. C.-----
5112	Pork-----	----do-----
5113	Mutton-----	----do-----
5114	Beef-----	----do-----
5116	Sausage-----	R. Q. McCracken, Waynesville, N. C.-----
5117	Beef-----	----do-----
5118	----do-----	R. M. Freeman, Waynesville, N. C.-----
5119	Sausage-----	----do-----
5120	Beef-----	Green & Kincard, Morganton, N. C.-----
5121	Ham-----	Kingan & Co., Richmond, Va.-----
5127	Beef-----	Forney & Co., Morganton, N. C.-----
5128	Mutton-----	----do-----
5129	Sausage-----	Star Market, Asheville, N. C.-----

AND SAUSAGE—NO ADULTERATION FOUND—CONTINUED.

Laboratory Number.	Retail Dealer.	Adulterants (Chemical Preservatives).
5085	Hoffman Meat Market, Salisbury, N. C. -----	None found.
5086	----do -----	do.
5087	----do -----	do.
5154	C. M. Sappenfield & Co., Concord, N. C. -----	do.
5088	----do -----	do.
5089	----do -----	do.
5090	J. F. Dayvault & Co., Concord, N. C. -----	do.
5091	----do -----	do.
5097	T. H. Austin, Charlotte, N. C. -----	do.
5098	----do -----	do.
5099	----do -----	do.
5100	T. H. Austin, Charlotte, N. C. -----	do.
5101	City Market, Gastonia, N. C. -----	do.
5102	----do -----	do.
5103	W. M. Davis, Gastonia, N. C. -----	do.
5404	----do -----	do.
5105	Kubler & Whitehead, Asheville, N. C. -----	do.
5106	----do -----	do.
5107	----do -----	do.
5108	Star Market, Asheville, N. C. -----	do.
5109	----do -----	do.
5110	----do -----	do.
4618	Robbin's Cash Grocery, Raleigh, N. C. -----	do.
4619	Chas. Crawford, Raleigh, N. C. -----	do.
5111	Star Market, Asheville, N. C. -----	do.
5112	----do -----	do.
5113	----do -----	do.
5114	----do -----	do.
5116	R. Q. McCracken, Waynesville, N. C. -----	do.
5117	----do -----	do.
5118	R. M. Freeman, Waynesville, N. C. -----	do.
5119	----do -----	do.
5120	Green & Kincard, Morganton, N. C. -----	do.
5121	----do -----	do.
5127	Forney & Co., Morganton, N. C. -----	do.
5128	----do -----	do.
5129	Star Market, Asheville, N. C. -----	do.

RESULTS OF THE EXAMINATION OF FRESH MEATS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
5132	Ham -----	Kingan & Co., Richmond, Va.-----
5139	Sausage -----	M. F. Morfew, Marion, N. C.-----
5140	Beef -----	do -----
5141	Sausage, Bologna -----	Kingan & Co., Richmond, Va.-----
5142	Beef -----	J. Yancey & Co., Marion, N. C. -----
5148	Sausage -----	P. T. Rhyne, Wadesboro, N. C. -----
5151	Beef -----	E. J. Baggett, Red Springs, N. C.-----
5130	Beef, sliced, Beechnut -----	Beechnut Packing Co., Canajoharie, N. Y.-----
5131	do -----	do -----
5155	Sausage -----	J. B. Green & Co., Raleigh, N. C. -----
5157	do -----	Young & Jones, Raleigh, N. C.-----
5167	do -----	J. B. Green & Co., Raleigh, N. C. -----
5168	do -----	Young & Jones, Raleigh, N. C.-----
4947	Veal -----	J. Schwartz, Raleigh, N. C.-----
*5152	Sausage, containing starch -----	Jacob B. Shafer, Baltimore, Md.-----
5189	Sausage, pork -----	Kingan & Co., Richmond, Va.-----

*Starch—Unnecessary material present, but its presence stated on label of package.

RESULTS OF THE EXAMINATION OF FRESH

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4915	Sausage -----	S. Cohn & Son, Goldsboro, N. C. -----
4943	do -----	Thomas Donaldson, Raleigh, N. C.-----
4944	do -----	do -----
4970	Sausage, mixed -----	Claude Pearce, Greensboro, N. C.-----
4976	Beef -----	-----
5080	Sausage -----	Murphy's Meat Market, Mount Airy, N. C. -----
5146	do -----	J. Schwartz, Raleigh, N. C.-----
5147	do -----	do -----
5149	do -----	E. R. Richardson, Raleigh, N. C.-----
5150	do -----	Towns & Co., Raleigh, N. C.-----

AND SAUSAGE—NO ADULTERATION FOUND—CONTINUED.

Laboratory Number.	Retail Dealer.	Adulterants (Chemical Preservatives).
5132	Star Market, Asheville, N. C. -----	None found.
5139	M. F. Morfew, Marion, N. C. -----	do.
5140	----do -----	do.
5141	J. Yancey & Co., Marion, N. C. -----	do.
5142	----do -----	do.
5148	P. T. Rhyne, Wadesboro, N. C. -----	do.
5151	E. J. Baggett, Red Springs, N. C. -----	do.
5130	Forney & Co., Morganton, N. C. -----	do.
5131	----do -----	do.
5155	J. B. Green & Co., Raleigh, N. C. -----	do.
5157	Young & Jones, Raleigh, N. C. -----	do.
5167	J. B. Green & Co., Raleigh, N. C. -----	do.
5168	Young & Jones, Raleigh, N. C. -----	do.
4947	J. Schwartz, Raleigh, N. C. -----	do.
*5152	J. R. Ferrall & Co., Raleigh, N. C. -----	do.
5189	W. B. Mann, Raleigh, N. C. -----	do.

MEATS AND SAUSAGE—FOUND ADULTERATED.

Laboratory Number.	Retail Dealer.	Adulterants (Chemical Preservatives).
4915	S. Conn & Son, Goldsboro, N. C. -----	Boric acid.
4943	Thomas Donaldson, Raleigh, N. C. -----	do.
4944	----do -----	do.
4970	Claude Pearce, Greensboro, N. C. -----	do.
4976	-----	do.
5080	Murphy's Meat Market, Mount Airy, N. C. -----	do.
5146	J. Schwartz, Raleigh, N. C. -----	do.
5147	----do -----	do.
5149	E. R. Richardson, Raleigh, N. C. -----	do.
5150	Towns & Co., Raleigh, N. C. -----	do.

RESULTS OF THE EXAMINATION OF OYSTERS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4643 Oysters-----	-----	-----
4644 ---do-----	-----	-----

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
5143 Codfish-----	-----	-----
5145 Codfish, soaked-----	-----	-----
4764 Crab Meat, deviled-----	-----	Tangier Packing Co., Crisfield, Md.-----

MINCE MEATS.

Nine samples of mince meats were examined for chemical preserva-

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4763 Mince Meat, Atmore's-----	-----	Atmore & Son, Philadelphia, Pa.-----
4762 Mince Meat, Mrs. Hopkins'-----	-----	E. G. Daily Co., Detroit, Mich.-----
4761 Mince Meat, Atmore's-----	-----	Atmore & Son, Philadelphia, Pa.-----
4760 Mince Meat, Peerless-----	-----	Libby, McNeill & Libby, Chicago, Ill.-----
4759 Mince Meat, Atmore's-----	-----	Atmore & Son, Philadelphia, Pa.-----
4757 Mince Meat, Premier-----	-----	Emery Provision Co., Chicago, Ill.-----
4555 Mince Meat, Atmore's-----	-----	Atmore & Son, Philadelphia, Pa.-----

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4758 Mince Meat, Star-----	-----	Kenwood Preserving Co., Chicago, Ill.-----
4755 Mince Meat-----	-----	J. P. Johnson & Co., New York-----

AND FISH—NO ADULTERATION FOUND.

Laboratory Number.	Retail Dealer.	Adulterants.
4643	C. D. Arthur, Raleigh, N. C.-----	None found.
4644	Britton Pearce, Raleigh, N. C.-----	do.

CODFISH—FOUND ADULTERATED.

Laboratory Number.	Retail Dealer.	Adulterants.
5143	J. R. Ferrall & Co., Raleigh, N. C.-----	Boric acid.
5145	-----do-----	Trace boric acid.
4764	Williams-Little Grocery Co., Wilson, N. C.-----	None found.

tives and coal-tar dyes. Sample No. 4755 contained benzoic acid, and sample No. 4758 contained salicylic acid.

The samples and results of the examination are as follows:

.MINCE MEATS—NO ADULTERATION FOUND.

Laboratory Number.	Retail Dealer.	Adulterants.	
		Preservatives.	Coloring Matter.
4763	D. G. Noland, Asheville, N. C.-----	None found-----	None found.
4762	Johnson Bros., Greenville, N. C.-----	-----do-----	do.
4761	D. J. Noland, Asheville, N. C.-----	-----do-----	do.
4760	Rose & Wilson, Winston, N. C.-----	-----do-----	do.
4759	D. G. Noland, Asheville, N. C.-----	-----do-----	do.
4757	-----	-----do-----	do.
4555	D. G. Noland, Asheville, N. C.-----	-----do-----	do.

MINCE MEATS—FOUND ADULTERATED.

Laboratory Number.	Retail Dealer.	Adulterants.	
		Preservatives.	Objectionable Coloring Matter.
4758	-----	Salicylic acid-----	None found.
4755	-----	Benzoic acid-----	do.

CATSUP AND SAUCES.

There is to be found on the market quite a variety of catsups and sauces, viz.: Walnut, Celery, Mushroom, Chili, Tomato and others, but the tomato catsup is by far the most popular of all the bottled catsups and sauces, and is consumed in large quantities at both private and public tables.

Tomato catsup is made of ripe tomatoes, strained to remove seed and skins. The strained pulp is then cooked with vinegar, spices and other flavoring materials to the desired consistency.

Sauces are made in a similar way, except with the addition of more vinegar and spices. Both catsup and sauces are bottled and closed while hot, to exclude fermenting germs, but if properly made the vinegar and spices should preserve them for a long while.

Many of the commercial catsups are made of good material, but others are made from the refuse of tomato canneries, pumpkin pulp or other inferior products. In past years most of them were artificially colored with bright-colored coal-tar dyes and preserved with chemical preservatives. There is possibly some excuse for the use of preservatives in this class of goods, but absolutely none for the

RESULTS OF THE EXAMINATION OF CATSUPS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4623	Catsup, Tomato, Surprise-----	Jos. Campbell Co., Camden, N. J.	D. T. Johnson, Raleigh, N. C.
4624	Catsup, Tomato, Beefsteak ----	-----do-----	-----do-----
4625	Catsup, Tomato, Heinz -----	H. J. Heinz Co., Pittsburg, Pa.	-----do-----
4626	-----do-----	-----do-----	W. B. Mann, Raleigh, N. C.
4627	Catsup, Tomato, Emery's -----	Emery Food Co., Chicago, Ill.	-----do-----
4628	Catsup, Tomato, Blue Label --	Curtice Bros. Co., Rochester, N. Y.	J. B. Green & Co., Raleigh, N. C.
4665	Catsup, Windsor -----	Windsor Packing Co., New York, N. Y.	McGaskill Grocery, Maxton, N. C.
4682	Catsup, Household -----	R. B. Stewart & Co., Baltimore, Md.	W. M. Smith, Goldsboro, N. C.

RESULTS OF THE EXAMINATION OF CAT

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4664	Catsup, Tomato, Hirsch's -----	Hirsch Bros. & Co., Louisville, Ky.	McGaskill Grocery, Maxton, N. C.
4666	-----do-----	-----do-----	Musselwhite Bros., Lumberton, N. C.
4667	Sauce, Chili, Boyle's-----	Geo. E. Boyle, St. Louis, Mo.	-----do-----

use of coal-tar dyes. The dye imparts to them a brilliant red color, and those who are unaware that the genuine uncolored goods have a dull red color believe it to be the natural color of the fruit. The objections to the use of these are many. They tend to deceive the purchaser, while they in no way improve the goods. They may serve to hide dirt and inferior materials. They are probably injurious to health and put the uncolored goods at a disadvantage in the market.

Since food officials have condemned the use of them so severely, they are disappearing from the market.

Since catsups and sauces are condiments and not foods to be eaten in large quantities, the State Food Law provides that they may, if the fact is stated on the label, contain not to exceed 0.2 per cent of benzoic acid.

Eleven samples were examined. Three, or a little more than 27 per cent of them, were found to be adulterated. All of the three contained coal-tar dyes. One contained salicylic acid and one contained sulphurous acid.

While a small amount of benzoic acid is not an adulterant in catsups and sauces, two of the samples examined did not contain any preservative at all.

AND SAUCES—NO ADULTERATION FOUND.

Laboratory Number.	Preservatives.	Adulterants.	Remarks.
4623	Benzoic acid -----	None found -----	
4624	----do -----	----do -----	
4625	None found -----	----do -----	Sample old.
4626	----do -----	----do -----	
4627	Benzoic acid -----	----do -----	
4628	----do -----	----do -----	
4665	----do -----	----do -----	
4682	None found -----	----do -----	

SUPS AND SAUCES—FOUND ADULTERATED.

Laboratory Number.	Preservatives.	Adulterants.	Remarks.
4664	Benzoic acid -----	Coal-tar dye -----	
4666	----do -----	Coal-tar dye, sulphites -----	Not properly labeled.
4667	-----	Salicylic acid; sulphites, coal-tar dye.	

CANNED SOUPS.

As there is no standard for soups, other than that they, like all other foods, shall not contain chemical preservatives or coal-tar dyes,

RESULTS OF THE

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4767	Soup, Bouillon, Maggi's -----	James P. Smith & Co., Chicago, Ill. -----
4768	----do -----	do -----
4769	Soup, Pea, Franco-American -----	Franco-American Food Co., Jersey City Heights, N. J. -----
5186	----do -----	do -----

CONDENSED OR EVAPORATED MILK.

Condensed or evaporated milk (sometimes erroneously known as evaporated cream) is milk from which a considerable portion of the water has been evaporated, and contains not less than 28 per cent of milk solids, of which not less than one-fourth is milk fat.

Sweetened condensed milk is milk from which a considerable portion of water has been evaporated, and to which sugar (sucrose) has been added, and contains not less than 28 per cent milk solids, not less than one-fourth of which is milk fat.

The evaporation is conducted in vacuum pans, at a temperature much below that of boiling water, thus avoiding a cooked taste in the product.

RESULTS OF THE EXAMINATION OF CON

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4770	Milk, condensed, Eagle -----	Borden Condensed Milk Co., New York -----
4771	----do -----	do -----
4772	----do -----	do -----
4773	----do -----	do -----
4774	----do -----	do -----
4775	----do -----	do -----
4780	Milk, condensed, Dime -----	do -----
4781	Milk, condensed, Eagle -----	do -----
4782	Milk, condensed, Dime -----	do -----
4783	----do -----	do -----

the samples examined under this head were tested for preservatives and coal-tar dyes only.

Four samples were examined, but no adulteration was found.

The samples and results of the examination are as follows:

EXAMINATION OF SOUPS.

Laboratory Number.	Retail Dealer.	Adulterants.	
		Preservatives.	Coloring Matter.
4767	Clarence Sawyer, Asheville, N. C. -----	None found -----	None found.
4768	-----do-----	-----do-----	do.
4769	-----	-----do-----	do.
5186	M. Rosenthal & Co., Raleigh, N. C. -----	-----do-----	do.

The composition of the product depends on the milk used, the degree of concentration and, if sweetened, the amount of sugar added.

The only form of adulteration practiced by manufacturers to any extent is the use of skimmed milk in the place of whole milk. Preservatives, as boric, benzoic and salicylic acids, are sometimes present, but they usually have been added by the producer or dealer. As the sterilization prevents fermentation, it is unnecessary for the manufacturer to add a preservative.

Sixteen samples of condensed milk were examined, and no adulteration was found. As the samples were old and in rather bad condition from age, they were examined only for preservatives, starch and glucose, and the amounts of milk solids and fat contained were not determined.

DENSED MILK—NO ADULTERATION FOUND.

Laboratory Number.	Retail Dealer.	Adulterants.
4770	J. H. Harris & Co., High Point, N. C. -----	None found.
4771	G. A. Greer, Asheville, N. C. -----	do.
4772	E. B. Hackbern, New Bern, N. C. -----	do.
4773	Caldwell & Carlyle, Lumberton, N. C. -----	do.
4774	-----	do.
4775	-----	do.
4780	J. F. Newsom, Littleton, N. C. -----	do.
4781	J. A. Newberry, Rockingham, N. C. -----	do.
4782	G. A. Greer, Asheville, N. C. -----	do.
4783	-----	do.

RESULTS OF THE EXAMINATION OF CON

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4784	Milk, Condensed, Dime-----	Borden Condensed Milk Co., New York-----
4785	----do-----	----do-----
4819	Milk, Condensed, Eagle-----	----do-----
4820	Milk, Condensed, Dime-----	----do-----
4821	Milk, Condensed, Peerless-----	----do-----
4822	Milk, Condensed, Our Pet-----	Helvetia Milk Co., Highland, Ill.-----

BAKING POWDERS.

The subject of aeration or leavening of breadstuffs by baking powder and yeast, and the examination of baking powders, were treated at length in the Food Reports of this Department, published in 1902 and 1906. For information on the subject not found here, the

RESULTS OF THE EXAMINATION OF BAKING

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4526	Bread Preparation, Horsford's	Rumford Chemical Works, Providence, R. I.	J. R. Ferrall & Co., Raleigh, N. C.
4527	----do-----	----do-----	M. Rosenthal & Co., Raleigh, N. C.
4538	----do-----	----do-----	J. R. Ferrall & Co., Raleigh, N. C.
4540	----do-----	----do-----	G. S. Terrell, Raleigh, N. C.---
4541	----do-----	----do-----	J. B. Green & Co., Raleigh, N. C.
4544	----do-----	----do-----	-----
4653	Baking Powder, Ferndell-----	Sprague, Warner & Co., Chicago, Ill.	J. R. Ferrall & Co., Raleigh, N. C.

DENSED MILK—NO ADULTERATION FOUND.

Laboratory Number.	Retail Dealer.	Adulterants.
4784	-----	None found.
4785	-----	do.
4819	W. B. Mann, Raleigh, N. C.-----	do.
4820	---do-----	do.
4821	---do-----	do.
4822	---do-----	do.

reader is referred to those reports, in which the results of a large number of samples were reported.

Seven samples of baking powders have been analyzed recently. No adulteration was found, and the amount of available carbon-dioxide gas that they contained showed good leavening quality.

The samples and results of the analyses are as follows:

POWDERS AND BREAD PREPARATIONS.

Laboratory Number.	Available Carbon Dioxide, Per Cent.	Residual Carbon Dioxide, Per Cent.	Total Carbon Dioxide, Per Cent.	Filler.	Class.	Remarks.
4526	10.90	2.20	13.10	-----	Acid phosphate	-----
4527	15.60	-----	-----	-----	do	-----
4538	15.02	0.55	15.57	-----	do	-----
4540	12.25	0.22	12.47	-----	do	-----
4541	15.18	0.18	15.36	-----	do	-----
4544	14.64	0.56	15.20	-----	do	-----
4653	14.28	-----	-----	Starch-----	Cream of tartar powder	-----

PRESERVES AND MARMALADES.

Preserves and marmalades are made by boiling down the fruit specified with enough cane sugar syrup, with or without spices, to prevent fermentation. They contain the fruit, either whole or the pulp, and, in the case of most small fruits, the seed and skins.

All preserves and marmalades containing ingredients other than those named above should be labeled "Imitation" or "Compounds"; otherwise they will be regarded as adulterated.

Thirty-seven samples of preserves and marmalades were examined; fourteen, or about 38 per cent, were found to be adulterated with either a chemical preservative or a coal-tar dye, or both. Eleven

RESULTS OF THE EXAMINATION OF PRESERVES

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4547	Preserves, Strawberry, Bar-le-Duc.	Not given -----	D. G. Noland, Asheville, N. C.-
4552	Marmalade, Dundee-----	Jas. Keiller & Sons, London, Eng.	---do-----
4556	Preserves, Raspberry, Monsoon	Sprague, Warner & Co., Chicago, Ill.	---do-----
4557	Preserves, Strawberry, Monsoon.	---do-----	---do-----
4561	Preserves, Raspberry, Purity	National Preserving Co., Baltimore, Md.	Bruner & Huey, Monroe, N. C.
4575	Marmalade, Orange-----	Chas. Southwell, London, Eng.	W. J. Malone, Charlotte, N. C.-
4581	Preserves, Strawberry, Himbeeren.	Minslinger & Heerlein Oppenheim, on Rhein, Germany.	D. G. Noland, Asheville, N. C.-
4583	Preserves, Raspberry, Highland.	The Williams Bros.Co., Detroit, Mich.	Foster Grocery Co., Monroe, N. C.
4586	Preserves, Quince, Dragon-----	---do-----	Johnson Bros., Greenville, N. C.
4587	---do-----	---do-----	G. W. Jones, Lumberton, N. C.
4588	Preserves, Strawberry, Highland.	---do-----	---do-----
4590	Preserves, Plum, Sunbeam----	Austin Nichols, New York----	D. G. Noland, Asheville, N. C.-
4637	Preserves, Victory-----	John Boyle Co., Baltimore, Md.	H. A. Powell Grocery Co., Goldsboro, N. C.
4639	Preserves, Quince, Libby's----	Libby, McNeill & Libby, Chicago, Ill.	W. B. Mann, Raleigh, N. C.---
4642	Preserves, Cherries, Taylor's Old Time.	Taylor Preserving Co., Boston, Mass.	J. B. Green & Co., Raleigh, N. C.
4638	Stuffed Dates, Beechnut-----	Beechnut Preserving Co., Canajoharie, N. Y.	D. T. Johnson, Raleigh, N. C.--
5036	Preserves, Peach, Heinz-----	H. J. Heinz, Pittsburg, Pa.----	J. D. Boon, Waynesville, N. C.-
5007	Preserves, Figs, Premier-----	Francis H. Leggett, New York	Ham Grocery Co., Greensboro, N. C.
5006	Marmalade, Orange-----	Cross & Blackwell, Soho Sq., London, Eng.	---do-----
4996	Preserves, Riche's Canton----	E. C. Riche, New York-----	Patterson Bros., Greensboro, N. C.
4998	Preserves, Blackberry, Fern-dell.	Sprague, Warner & Co., Chicago, Ill.	---do-----
5002	Preserves, Strawberry, Libby's	Libby, McNeill & Libby, Chicago, Ill.	---do-----
5021	Marmalade, Orange, Beechnut	Beechnut Packing Co., Canajoharie, N. Y.	J. F. Jamison, Charlotte, N. C.-

samples contained chemical preservatives; seven contained coal-tar dyes, and one (blackberry preserves) was adulterated with other small berries.

These samples were tested for chemical preservatives and coal-tar dyes only. Three samples (Nos. 4591, 4630 and 4679) contained sulphites or sulphurous acid. Sulphite or sulphurous acid has both preservative and bleaching properties. As it tends to destroy the natural color of the fruit, sulphite is rarely used in this class of goods for a preservative. In sample No. 4674 (blackberry preserves) other small berries were incidentally discovered, which, under the label that the samples bore, are considered adulterants.

AND MARMALADES—NO ADULTERATION FOUND.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4547	None found -----	None found-----	Not properly labeled.
4552	---do-----	---do-----	
4556	---do-----	---do-----	
4557	---do-----	---do-----	
4561	---do-----	---do-----	
4575	---do-----	---do-----	
4581	---do-----	---do-----	
4583	---do-----	---do-----	
4586	---do-----	---do-----	
4587	---do-----	---do-----	
4588	---do-----	---do-----	
4590	---do-----	---do-----	
4687	---do-----	---do-----	
4639	---do-----	---do-----	
4642	---do-----	---do-----	
4638	---do-----	---do-----	
5036	---do-----	---do-----	
5007	---do-----	---do-----	
5006	---do-----	---do-----	
4996	---do-----	---do-----	
4998	---do-----	---do-----	
5002	---do-----	---do-----	
5021	---do-----	---do-----	

RESULTS OF THE EXAMINATION OF PRE

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4553	Preserves, Pineapple, Home-made.	-----	W. M. Harris & Co., Salisbury, N. C.
4573	Preserves, Plum, Fort Henry.	The West Va. Preserving Co., Wheeling, W. Va.	Bridgers & Co., Charlotte, N. C.
4582	Preserves, Blackberry, L. P. C.	Louisville Preserving Co., Louisville, Ky.	Foster Grocery Co., Monroe, N. C.
4585	Preserves, Strawberry, Duchess.	The John Boyle Co., Baltimore, Md.	J. R. Simpson & Co., Monroe, N. C.
4591	Preserves, Cherry, Queen City	The J. Weller Co., Cincinnati, O.	Bost & Newton, Hickory, N. C.
4630	Preserves, Blackberry, Mayflower.	-----	W. B. Mann, Raleigh, N. C. ---
4673	Preserves, Pineapple-----	Ontario Preserving Co., Middleport, N. Y.	Musselwhite Bros., Lumberton, N. C.
4674	Preserves, Blackberry, Duchess.	Jno. Boyle & Co., Baltimore, Md.	-----do-----
4679	Preserves, Cherry -----	-----	R. E. Peacock, Fremont, N. C.
4997	Marmalade, Orange, Fresh Fruit.	Curtice Bros. Co., Rochester, N. Y.	Patterson Bros., Greensboro, N. C.
4999	Marmalade, Orange, XX Brand	P. J. Ritter Conserve Co., Philadelphia, Pa.	-----do-----
5018	Preserves, Quince, Queen City.	The J. Weller Co., Cincinnati, O.	J. F. Jamison, Charlotte, N. C.
5019	Preserves, Crabapple, Richelieu	Sprague Warner Co., Chicago, Ill.	-----do-----
5081	Marmalade, Orange -----	P. J. Ritter Conserve Co., Philadelphia, Pa.	-----

JAM.

Jam, like preserves, is the specified fruit boiled down with sufficient cane sugar syrup to prevent fermentation. Unlike preserves, however, it is not hardened during cooking, but is cooked to a pulp.

Besides the adulterants usually found in preserves, as jam is cooked to a pulp, other and cheaper fruits than the one specified are often used to adulterate it.

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4986	Jam, Plum, L. P. C. -----	Louisville Preserving Co., Louisville, Ky.	Hudson Grocery Co., Greensboro, N. C.
4637	Jam, Grape, Beechnut -----	Beechnut Preserving Co., Canajoharie, N. Y.	D. T. Johnson, Raleigh, N. C. --
4564	Jam, Raspberry, Compound, Crescent.	S. J. Van Lill & Co., Baltimore, Md.	People's Grocery Co., Lumberton, N. C.
4592	Jam, Green Gage -----	Cross & Blackwell, Soho Square, London, England.	D. G. Noland, Asheville, N. C. -
5040	Jam, Grape, Beechnut -----	Beechnut Preserving Co., Canajoharie, N. Y.	J. D. Boon, Waynesville, N. C. -
5180	Jam, Quince -----	The Goodwin Preserving Co., Louisville, Ky.	D. G. Noland, Asheville, N. C. -
5182	Jam, Blackberry and Apple----	Reid, Murdock & Co., Chicago, Ill.	-----do-----
5184	Jam, Raspberry, Beechnut----	Beechnut Preserving Co., Canajoharie, N. Y.	Bristol & Harbison, Morganton, N. C.
5004	Jam, Blackberry, Richelieu ---	Sprague, Warner & Co., Chicago, Ill.	Ham Grocery Co., Greensboro, N. C.
5020	Jam, Fig, Monarch -----	Reid, Murdock & Co., Chicago, Ill.	J. F. Jamison, Charlotte, N. C. -

SERVES AND MARMALADES—FOUND ADULTERATED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4553	Benzoic acid -----	Coal-tar dye -----	Not properly labeled.
4573	-----	do -----	
4582	-----	do -----	
4585	Salicylic acid -----	do -----	Not properly labeled.
4591	Sulphites, benzoic acid -----	do -----	
4630	do -----	do -----	
4673	Benzoic acid -----	None found -----	Not properly labeled; contained other small berries.
4674	-----	do -----	
4679	Sulphites -----	do -----	
4997	Benzoic acid -----	do -----	
4999	do -----	do -----	
5018	do -----	Coal-tar dye -----	
5019	do -----	None found -----	
5181	do -----	do -----	

Jam is often labeled "Fruit Jam," with the flavor specified. In that case it is not necessary to name all the fruits present. If a jam contains anything other than fruit and cane sugar, with or without spices, the fact must be indicated on the label by either naming the ingredient or labeling it "Compound" or "Imitation."

Fourteen samples of jam were examined, four of which were found to contain benzoic acid. They were not examined for other fruits than those specified or for glucose syrup.

JAMS—NO ADULTERATION FOUND.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4986	None found -----	None found.	
4637	do -----	do -----	
4564	do -----	do -----	
4592	do -----	do -----	
5040	do -----	do -----	
5180	do -----	do -----	
5192	do -----	do -----	
5184	do -----	do -----	
5004	do -----	do -----	
5020	do -----	do -----	

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4635	Jam, Fruit, Southwark -----	American Preserve Co., Philadelphia, Pa.	J. B. Green & Co., Raleigh, N. C.
4636	Jam, Apricot, Campbell's -----	Jos. Campbell Preserving Co., Camden, N. J.	D. T. Johnson, Raleigh, N. C.--
4668	Jam, Strawberry -----	Franklin Preserving Co., Franklin St., New York, N. Y.	McGaskill Grocery, Maxton, N. C.
5179	Jam, Strawberry, Seal -----	P. J. Ritter & Co., Philadelphia, Pa.	-----

JELLY.

Fruit jelly is a clear, gelatinous product, made entirely from the fruit specified and cane sugar, with or without spices. Fruit jelly containing ingredients other than those named above should be labeled as "Imitation" or "Compounds"; otherwise they will be regarded as adulterated. The following ingredients are often used in compound and adulterated fruit products: Foreign gelatinous matter (starch paste, apple jelly, gelatin, etc.); sweetening materials (glucose, saccharine, etc.); coal-tar and other dyes; artificial flavors; fruit acids (citric and tartaric acids); chemical preservatives (salicylic acid, benzoic acid, etc.).

The various foreign gelatinous substances, some artificial flavors and vegetable dyes, citric and tartaric acids and pure glucose syrup are harmless in foods, though they are adulterants when present in products not labeled as compounds; but chemical preservatives, many coal-tar dyes, saccharine, glucose syrup containing sulphurous acid,

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4686	Jelly, Fruit, National -----	American Preserve Co., Philadelphia, Pa.	H. A. Powell Grocery Co., Goldsboro, N. C.
4688	Jelly, Compound, Schimmel's -----	do -----	do -----
4632	Jelly, Currant -----	Jamestown Preserving Co., Baltimore, Md.	J. B. Green Co., Raleigh, N. C.
4684	Jelly, Compound, Crescent -----	S. J. Van Lill Co., Baltimore, Md.	B. F. Grady, Goldsboro, N. C.--
4685	Jelly, Compound -----	do -----	Pittman Bros., Goldsboro, N. C.
4548	Jelly, Grape, Welch's -----	Welch Grape Juice Co., Westfield, N. Y.	D. G. Noland, Asheville, N. C.--
4550	Jelly, Game, Richelieu -----	Sprague, Warner & Co., Chicago, Ill.	do -----
4551	Jelly, Crabapple, Sunbeam -----	Austin, Nichols & Co., New York.	do -----
4559	Jelly, Blackberry, Compound, Jamestown.	Jamestown Preserving Co., Baltimore, Md.	G. W. Jones, Lumberton, N. C.
4560	Jelly, Blackberry, Compound, Crescent.	S. J. Van Lill Co., Baltimore, Md.	-----

OF JAMS—FOUND ADULTERATED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4635	Benzoic acid.	None found.	
4636	---do---	---do---	
4668	---do---	---do---	
5179	---do---	---do---	

and flavors consisting of ethers, are injurious to health, or, at least, are not so wholesome and palatable as the pure fruit products.

Except artificial flavors, the above products have been discussed in former reports of the Department.

Artificial flavors used in imitation jellies and other fruit products are prepared entirely from chemicals, chiefly the so-called "fruit ethers." These mixtures have a peculiar taste and odor and are unwholesome. They will be further discussed in a future report.

Fifty samples of jelly were examined; twenty-four, or 48 per cent, were found to be adulterated; eighteen, or 36 per cent of them, contained chemical preservatives.

For the lack of time, these samples were not examined for other adulterants that may have been present. However, judging from the odor and taste, many of them contained ingredients, besides preservatives and coal-tar dyes, which, if their presence were not stated on the label, were adulterants.

JELLIES—NO ADULTERATION FOUND.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4636	None found	None found	
4638	---do---	---do---	
4632	---do---	---do---	
4634	---do---	---do---	
4635	---do---	---do---	
4548	---do---	---do---	
4550	---do---	---do---	
4551	---do---	---do---	
4559	---do---	---do---	
4560	---do---	---do---	

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4562	Jelly, Raspberry, Williams	The Williams Bros. Co., Detroit, Mich.	Foster Grocery Co., Monroe, N. C.
4565	Jelly, Raspberry, Wagner's	Martin Wagner Co., Baltimore, Md.	Williams-Little Grocery Co., Wilson, N. C.
4589	Jelly, Blackberry, Quaker	The John Boyle Co., Baltimore, Md.	-----
4594	Jelly, Currant, Heinz	H. J. Heinz Co., Pittsburg, Pa.	-----
4551	Jelly, Crabapple, Sunbeam	Austin, Nichols & Co., New York.	D. G. Noland, Asheville, N. C.
4987	Jelly, Fresh Grape, Schimmel's.	American Preserve Co., Philadelphia, Pa.	Hudson Grocery Co., Greensboro, N. C.
4988	Jelly, Apple, Cardinal	The Goodwin Preserving Co., Louisville, Ky.	do -----
4989	do	do	do -----
4990	Jelly, Our Best	do	C. S. Scott & Co., Greensboro, N. C.
5001	Jelly, Apple, Wilco	The Williams Bros. Co., Detroit, Mich.	Patterson Bros., Greensboro, N. C.
5008	Jelly, Currant, Premier	Francis H. Leggett, New York.	Ham Grocery Co., Greensboro, N. C.
5037	Jelly, Fruit, Compound, Highland.	The E. G. Daily Co., Detroit, Mich.	J. D. Boon, Waynesville, N. C.
5039	Jelly, Apple, Grape Flavor	American Preserve Co., Philadelphia, Pa.	do -----
5177	Jelly, Compound, Currant Flavor, Schimmel's.	do	D. G. Noland, Asheville, N. C.
5183	Jelly, Currant, Heinz	H. J. Heinz Co., Pittsburg, Pa.	-----
5178	Jelly, Cranberry, Libby's	Libby, McNeill & Libby, Chicago, Ill.	-----

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4549	Jelly, Plum, L. P. C.	Louisville Preserving Co., Louisville, Ky.	D. G. Noland, Asheville, N. C.
4554	Jelly, Grape, L. P. C.	do	do -----
4558	Jelly, Blackberry, Queen City	The J. Weller Co., Cincinnati, Ohio.	McManus, Short & Co., Charlotte, N. C.
4567	Jelly, Currant, Schimmel's Compound.	The American Preserve Co., Philadelphia, Pa.	Bridgers & Co., Charlotte, N. C.
4568	do	Sewell Preserving Co., Baltimore, Md.	People's Grocery Co., Lumberton, N. C.
4569	Jelly, Strawberry, Queen City Compound.	The J. Weller Co., Cincinnati, Ohio.	The Foster Grocery Co., Monroe, N. C.
4570	Jelly, Quince, Jamestown Compound.	Jamestown Preserving Co., Baltimore, Md.	G. W. Jones, Lumberton, N. C.
4571	Jelly, Grape, Queen City	The J. Weller Co., Cincinnati, Ohio.	do -----
4572	Jelly, Damson, Baltimore	Sewell Preserving Co., Baltimore, Md.	H. C. Watson, Rockingham, N. C.
4574	Jelly, Plum, L. P. C.	Louisville Preserving Co., Louisville, Ky.	The Foster Grocery Co., Monroe, N. C.
4584	Jelly, Raspberry, Schimmel's	American Preserve Co., Philadelphia, Pa.	Bridgers & Co., Charlotte, N. C.
4593	Jelly, Blackberry, Schimmel's	do	D. G. Noland, Asheville, N. C.
4595	Jelly, Blackberry, Quaker	The John Boyle Co., Baltimore, Md.	-----
4631	Jelly, Blackberry, Old Orchard	Kidwell Bros. Co., Baltimore, Md.	J. B. Green & Co., Raleigh, N. C.

JELLIES—NO ADULTERATION FOUND—CONTINUED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4562	do	None found	
4565	do	do	
4589	do	do	
4594	do	do	
4551	do	do	
4987	do	do	
4988	do	do	
4989	do	do	
4990	do	do	
5001	do	do	
5008	do	do	
5037	do	do	
5039	do	do	
5177	do	do	
5183	do	do	
5178	do	do	

OF JELLIES—FOUND ADULTERATED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Objectionable Coloring Matter.	
4549		Coal-tar dye	
4554		do	
4558	Sulphites, benzoic acid	do	
4567	Benzoic acid		
4568	do	Coal-tar dye	
4569	do	do	
4570		do	
4571		do	
4572	Benzoic acid	do	
4574		do	
4584	Benzoic acid	do	
4593		do	
4595		do	
4631		do	

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4633	Jelly, Apple-----	S. J. Van Lill Co., Baltimore, Md.	J. B. Green & Co., Raleigh, N. C.
4634	Jelly, Blackberry, Old Orchard	Kidwell Bros. Co., Baltimore, Md.	do-----
4675	Jelly, Currant-----	Central Preserving Co., Central St., Boston, Mass.	Musselwhite Bros., Lumberton, N. C.
4676	Jelly, Apple-----	P. J. Ritter Conserve Co., Philadelphia, Pa.	J. H. Wishart, Lumberton, N. C.
4629	Jelly, Currant, Pomona-----	do-----	D. T. Johnson, Raleigh, N. C.--
4689	Jelly, Compound, Highland---	Sewell Preserving Co., Baltimore, Md.	Walter E. Denmark, Goldsboro, N. C.
5023	Jelly, Fruit Compound, L. P. C.	Louisville Preserving Co., Louisville, Ky.	Elite Grocery, Gastonia, N. C.--
5038	Jelly, Quince Flavor, Queen City.	The J. Weller Co., Cincinnati, Ohio.	J. D. Boon, Waynesville, N. C.--
5172	Jelly, Compound, Artificial Flavor, Highland.	Gibbs Preserving Co., Baltimore, Md.	Pleasants Grocery Co., Aberdeen, N. C.
5176	Jelly, Apple, Empress-----	-----	-----

FRUIT BUTTERS.

Fruit butters, like jams, are made by cooking the fruit pulp with cane sugar and usually with spices. For fruit butter, the skins and

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4640	Butter, Apple, Wilco-----	The Williams Bros. Co., Detroit, Mich.	D. T. Johnson, Raleigh, N. C.--
4641	Butter, Apple, Heinz-----	H. J. Heinz Co., Pittsburg, Pa.--	W. B. Mann, Raleigh, N. C.---
4579	Butter, Apple, Purity-----	National Preserve Co., Baltimore, Md.	S. H. Youngblood, Charlotte, N. C.
4580	Butter, Apple, Dragon-----	The Williams Bros. Co., Detroit, Mich.	Foster Grocery Co., Monroe, N. C.
4578	Butter, Peach, Queen City----	The J. Weller Co., Cincinnati, O.	People's Grocery Store, Lumberton, N. C.
5185	Butter, Apple, Empire-----	Louisville Preserving Co., Louisville, Ky.	Bristol & Harbison, Morganton, N. C.

JELLIES—FOUND ADULTERATED—CONTINUED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Objectionable Coloring Matter.	
4633	Benzoic acid-----	-----	Not properly labeled.
4634	----do-----	Coal-tar dye-----	
4675	Sulphites, benzoic acid-----	-----	
4676	Benzoic acid-----	-----	
4629	----do-----	-----	
4689	----do-----	-----	
5023	-----	Coal-tar dye-----	
5038	Benzoic acid-----	----do-----	
5172	----do-----	----do-----	
5176	----do-----	-----	

seed are removed from the pulp. The adulterants usually found in fruit butter are the same as those found in other similar fruit products.

Only six samples were examined, and all were found to be adulterated with benzoic acid. No. 4578, a peach butter, contained both benzoic acid and a coal-tar dye.

FRUIT BUTTERS—FOUND ADULTERATED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4640	Benzoic acid-----	None found-----	
4641	----do-----	----do-----	
4579	----do-----	----do-----	
4580	----do-----	----do-----	
4578	----do-----	Coal-tar dye-----	
5185	----do-----	None found-----	

MARASCHINO CHERRIES:

Very few of the cherries labeled and sold as "Maraschino Cherries" have any claim upon the name under which they are sold, for they contain not a trace of Maraschino brandy. Maraschino brandy is the most celebrated liquor of Italy and is distilled from a small cherry (gean or mazzard), with which, in fermenting, honey and the leaves and kernels of the fruit are mixed. Cherries on the market sold as Maraschino cherries, instead of being preserved in Maraschino brandy, are generally preserved with sulphurous acid or benzoic acid.

RESULTS OF THE EXAMINATION OF CHERRIES, MARAS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4669	Cherries, Maraschino -----	Gobelin, Fils & Co., Bordeaux, France.	Carpenter Grocery, Wilmington, N. C.
4670	Cherries, Creme de Menthe----	Austin, Nichols & Co., New York	J. H. Wishart, Lumberton, N. C.
4671	Cherries, Maraschino XXXX--	C. W. Antrim & Son, New York	Liles & Hamilton, Hamlet, N. C.
4577	----do -----	Cincinnati Extract Works, Cincinnati, O.	Bridgers & Co., Charlotte, N. C.
4809	Cherries, Premier -----	Francis H. Leggett & Co. -----	M. Rosenthal & Co., Raleigh, N. C.
4810	Cherries, Maraschino-----	R. C. Williams, New York-----	do-----
4811	----do -----	do -----	do-----
5003	Cherries, Creme de Violet----	Cincinnati Extract Works, Cincinnati, O.	Patterson Bros., Greensboro, N. C.

The natural color of the fruit, which is destroyed by sulphurous acid, is replaced by coal-tar dye, which is not affected by the acid.

Eight samples of these cherries were examined, and all were found to contain both chemical preservatives and coal-tar dyes. However, the fact was stated on the label of most of them that they were artificially colored and preserved. It was claimed that No. 4809 was colored with carmine, and Nos. 4669 and 5003 were colored with alizarine, but all proved to contain coal-tar colors, as will be seen by reference to the following table:

CHINO, CREME DE MENTHE—FOUND ADULTERATED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4669	Benzoate of soda -----	Coal-tar dye -----	Presence of brandy not de- tected.
4670	Sulphites -----	do -----	do -----
4671	do -----	do -----	do -----
4577	do -----	do -----	do -----
4809	do -----	do -----	do -----
4810	Benzoic acid -----	do -----	do -----
4811	do -----	do -----	do -----
5003	do -----	do -----	do -----

CIDERS AND ARTIFICIAL OR IMITATION CIDERS.

Ciders, to comply with the North Carolina Food Law, must be made entirely of unadulterated fruit juices and be sold under the name of the fruit from which they have been made. No color or flavor shall be added unless the fact is made known by proper label attached to each package. When artificially colored or flavored, or both, these products must be sold as artificial, imitation or compound products, or they will be classed as adulterated. They will also be classed as adulterated if they contain any coal-tar dye or any chemical preservatives except eight-thousandths of one per cent of sulphurous acid, which is enough only to fumigate the cask.

Of this class of beverages thirty-seven samples have been examined,

RESULTS OF THE EXAMINATION OF CIDERS AND IMITA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4464	Cider, Peach -----	-----	Geo. S. Kernodle, Reidsville, N. C.
4537	Cider, No. 24* -----	-----	S. A. Hahn, Hickory, N. C. -----
4546	Cider, Jelico* -----	Norton Vinegar and Cider Co., Statesville, N. C.	-----
4547	Cider, Apple, No. 1001* -----	W. H. Hildick, New York City	Norton Vinegar and Cider Co., Statesville, N. C.
4615	Cider, Blackberry* -----	-----	G. L. Smith, Hope Mills, N. C. -----
4651	Cider, Apple* -----	-----	Chas. Horne, Clayton, N. C. -----
4694	----do* -----	The Hicks Co., Wilmington, N. C.	C. B. King, Raleigh, N. C. -----
4828	----do* -----	Price & Lucas Cider and Vinegar Co., Louisville, Ky.	Blackwell & Bushnell, Waynes- ville, N. C.
4829	----do* -----	-----	A. T. Matthews, Spray, N. C. -----
4830	Cider, Golden Rod* -----	-----	S. Davis, Spray, N. C. -----
4831	Cider, Shello* -----	-----	-----do-----
4834	Cider, Peach* -----	-----	A. R. Trexler, Spray, N. C. -----
4837	Cider, Apple* -----	-----	J. W. Lucas, Smithfield, N. C. -----
4844	----do* -----	Red Cross Vinegar Co., St. Louis, Mo.	John McLean, Red Springs, N. C.
4845	----do* -----	Haynor Manufacturing Co., Nor- folk, Va.	A. H. Bond, Red Springs, N. C.
4847	----do* -----	-----	A. T. McCallum, Red Springs, N. C.
4848	----do* -----	-----	-----do-----
4850	Cider, Cherry, Burr's Royal* -----	Burr Manufacturing Co., Rich- mond, Va.	W. F. Parker, Goldsboro, N. C. -----
4851	Cider, Blackberry, Burr's Royal* -----	-----do-----	-----do-----
4852	Cider, Grape, Burr's Royal* -----	-----do-----	-----do-----
4853	Cider, Peach, Burr's Royal* -----	-----do-----	-----do-----
4843	----do* -----	Haynor Manufacturing Co., Norfolk, Va.	John McLean, Red Springs, N. C.
4883	Cider, Puritan* -----	Fleming & Christian, Richmond, Va.	D. J. Bost, Concord, N. C. -----
4884	Cider, Blue Ribbon* -----	O. L. Gregory Vinegar Co., Richmond, Va.	G. W. Patterson, Concord, N. C. -----
4885	----do* -----	Kirk-Shelly Vinegar Co., Rich- mond, Va.	-----

*Samples sent to the Department by local dealers and others for analysis.

†Party who sent sample to the Department for analysis.

only seven of which proved not to be adulterated. The adulterated samples contained chemical preservatives, coal-tar dyes or artificial flavor, with the presence of the latter not stated on the label.

A majority of these samples were wholly artificial or imitation products, while many of them were compound products, containing a small quantity of fruit cider.

On account of the sale of these products in territories where the sale of alcoholic beverages is prohibited by law, many of these samples were sent to the Department by city officials or other citizens for the determination of the amount of alcohol contained or supposed to be contained. The sale of them was often discontinued, either on account of the amount of alcohol found to be present or adulterants which rendered their sale in the State illegal.

TION OR ARTIFICIAL CIDERS—FOUND ADULTERATED.

Laboratory Number.	Alcohol—Per Cent by Vol.	Solid Matter in Solution—Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4464	12.01	17.34	Salicylic acid -----	-----	Artificial product.
4537	5.10	12.11	Sulphites in excess-----	Coal-tar dye-----	do.
4546	2.40	20.40	Salicylic acid -----	do -----	do.
4547	6.60	2.65	Benzoic acid -----	-----	Apple cider.
4615	10.35	14.30	do -----	Coal-tar dye-----	Artificial product.
4651	6.50	11.73	do -----	-----	
4694	6.50	6.30	do -----	Coal-tar dye-----	do.
4828	4.90	10.90	do -----	-----	do.
4829	5.35	4.21	do -----	-----	
4830	7.75	3.74	do -----	-----	do.
4831	7.45	20.05	Salicylic acid -----	Coal-tar dye-----	do.
4834	6.50	7.27	do -----	-----	do.
4837	0.70	13.13	Benzoic acid -----	-----	
4844	7.10	10.40	Benzoic acid, sulphites in excess.	-----	Compound (apple cider, etc.).
4845	6.15	2.75	Benzoic acid -----	-----	do.
4847	4.95	5.36	do -----	-----	Artificial product.
4848	2.90	5.27	do -----	-----	do.
4850	7.50	11.29	Benzoic acid, sulphites in excess.	-----	do.
4851	7.25	6.00	do -----	-----	do.
4852	7.30	3.05	do -----	-----	do.
4853	6.65	4.37	do -----	-----	do.
4843	7.20	9.85	do -----	-----	Compound (apple cider, etc.).
4883	-----	-----	Sulphites in excess -----	-----	
4884	-----	-----	Benzoic acid -----	-----	
4885	-----	-----	Salicylic acid -----	-----	

RESULTS OF THE EXAMINATION OF CIDERS AND IMITATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4886	Cider, Peach* -----	O. L. Gregory Vinegar Co., Richmond, Va.	-----
4889	Cider, Imitation Burman* -----	-----	J. D. Overton, Nashville, N. C.--
4905	----do* -----	Burr Manufacturing Co., Rich- mond, Va.	J. R. Crawford, Old Fort, N. C.--
5059	Cider, Imitation Blue Grass Bell.	Jones Bros. & Co., Louisville, Ky.	J. G. Ball, Raleigh, N. C. -----
5187	Cider, Compound, Senoj-----	----do -----	----do -----

RESULTS OF THE EXAMINATION OF CIDERS AND IMITA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
5058	Cider, Imitation* -----	-----	Norton Vinegar and Cider Co., Statesville, N. C.
5069	Cider, Imitation* -----	-----	----do-----
4906	----do -----	E. S. Shelly Vinegar Co., Rich- mond, Va.	J. R. Crawford, Old Fort, N. C.--
4717	Cider, Champagne Rhodo- dendron.	R. Gustavine, Black Mountain, N. C.	Noland-Roland Grocery Co., Asheville, N. C.
4823	Cider, Maiden Blush* -----	O. L. Gregory Vinegar Co., Padu- cah, Ky.	J. L. Smathers, Murphy, N. C. --
4620	Cider, California Cham- pagne.*	-----	Sol. Caslar, Asheville, N. C. ----
4647	Cider, Puritan* -----	-----	J. T. Capers, Jr., Kelford, N. C.--

FRUIT JUICES AND ARTIFICIAL OR IMITATION FRUIT
JUICES.

These products, like ciders, must be made entirely from fruit and sold under the name of the fruit from which they have been made.

RESULTS OF THE EXAMINATION OF FRUIT

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4891	Orange Juice -----	-----	J. D. Overton, Nashville, N. C.--
4892	Peach Juice, Imitation -----	-----	----do-----
4907	Lime Juice -----	Norton Vinegar and Cider Co., Statesville, N. C.	Norton Vinegar and Cider Co., Statesville, N. C.
5057	Tomato Juice -----	-----	G. I. Smith, Buie's Creek, N. C. -
4698	Grape Juice, Welch's -----	Welch Grape Juice Co., West- field, N. Y.*	H. T. Hicks, Raleigh, N. C. -----

*Samples sent to the Department by local dealers and others for analysis.

†Party who sent sample to the Department for analysis.

OR ARTIFICIAL CIDERS—FOUND ADULTERATED—CONTINUED.

Laboratory Number.	Alcohol—Per Cent by Vol.	Solid Matter in Solution—Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4886			Benzoic acid		Artificial product.
4889	7.15		do	Coal-tar dye	Compound.
4905	4.40	8.95	do		Artificial product.
5059		10.88	do		do.
5187	3.50		do	Coal-tar dye	

TION OR ARTIFICIAL CIDERS—NOT FOUND ADULTERATED.

Laboratory Number.	Alcohol—Per Cent by Vol.	Solid Matter in Solution—Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
5058	0.25		None found	None found	Artificial product.
5069	0.45		do	do	do.
4906	3.30	4.88	do	do	
4717	5.90		do	do	Apple cider.
4823	8.10	12.94	do	do	
4620		13.17	do	do	
4647	8.15	5.01	do	do	

What is true of ciders in regard to preservatives, coloring and flavoring is also true of fruit juices.

Only five samples of these beverages were examined; two were found to be adulterated; in the other three no adulteration was found.

JUICES AND IMITATION FRUIT JUICES.

Laboratory Number.	Alcohol—Per Cent. by Volume.	Solid Matter in Solution, Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4891	0.40		Benzoic acid	Coal-tar dye	Imitation or compound product. do.
4892	3.90		do	do	
4907			None found	None found	
5057	0.70	3.15	do	do	
4698			do	do	

PICKLES.

Pickles are clean, sound, properly prepared cucumbers or other vegetables that have not taken up any metallic compound other than common salt, preserved in any kind of vinegar, with or without spices.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4678	Pickles, Sweet, Hyman's----	The Hyman Pickle Co., Louisville, Ky.	Caldwell & Carlyle, Lumberton, N. C.
4681	----do-----	-----do-----	J. D. Daniels, Goldsboro, N. C. --
4696	Pickle, Spices, Heinz-----	H. J. Heinz Co., Pittsburg, Pa.--	J. B. Green, Raleigh, N. C. -----
5077	Pickle, Blue Grass Bell-----	Jones Bros., & Co., Louisville, Ky.	J. G. Ball, Raleigh, N. C. -----
5144	Pickle, Picnic-----	Mrs. R. J. Johnson Pickle Co., Richmond, Va.	Len H. Adams, Raleigh, N. C.---
5188	Pickle, Monogram-----	Knadler & Lucas, Louisville, Ky.	Theo. Atwell, Salisbury, N. C.---

VINEGAR.

When the first report on this subject was made, under the law, in 1900, the quality of the vinegar offered for sale in the State was very poor, and hardly any pure cider vinegar could be bought. Since that time the quality has gradually improved, and now it is not a difficult matter to get a good article, although there are inferior goods on the market yet that are not properly branded.

The subject of vinegar and its examination for adulteration has been discussed at considerable length in previous Food Reports of the Department, to which, for information not found here, the reader is referred.*

When vinegar is sold without naming the class to which it belongs, according to the standards, it means a product made from cider.

RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4657	Vinegar, Monogram Blend--	R. M. Hughes & Co., Louisville, Ky.	People's Supply Co., Wilmington, N. C.
4658	Vinegar, Distilled Spirits----	-----do-----	-----do-----
4659	Vinegar, Apple Cider-----	-----do-----	L. H. Partin, Wilmington, N. C.--
4660	----do-----	-----do-----	-----do-----
4661	Vinegar, Distilled Spirits---	Samuel Bear, Sr.'s Sons, Wilmington, N. C.	Jourgen Harr, Wilmington, N. C.

*First, second, fourth, sixth and seventh Food Reports.

†Retail dealer or name of party who sent sample to the Department for analysis.

Sweet pickles are "pickles" in the preparation of which sugar (sucrose) is used.

Six samples of pickles were examined, four of which were found to be adulterated. In three of them benzoic acid was found; in three of them saccharine was found, and two of the number contained both saccharine and benzoic acid.

NATION OF PICKLES.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Sweetener.	
4678	Benzoic acid-----	Saccharine-----	
4681	----do-----	----do-----	
4696	None found-----	None found-----	
5077	Benzoic acid-----	----do-----	
5144	None found-----	Saccharine-----	
5188	----do-----	None found-----	

Therefore, when a vinegar is sold under a brand or trade name, it should state the class to which it belongs; otherwise it will be presumed to be an apple-cider vinegar; then, in case it is not a cider vinegar, it will be classed as misbranded and its sale in the State a violation of the Food Law.

During the year thirty-nine samples of vinegar have been examined, twelve, or a little more than 30 per cent, of which proved to be adulterated, misbranded or misrepresented. The principal violation of the law in the sale of vinegar is the selling of one vinegar for another, or by mixing a cheaper variety with a more expensive one and selling the product for the more desirable vinegar, as will be seen by reference to the following table, which contains the results of the examination:

NATION OF VINEGAR.

Laboratory Number.	Total Acidity (Acetic Acid) — Per Cent.	Total Solids — Per Cent.	Ash — Per Cent.	Lead Subacetate.	Sodium Bicarbonate.	The indications are that this is—
4657	4.18	.26	.03	No precipitate-----	No change-----	Distilled spirit vinegar, colored, misbranded.
4658	4.03	.34	.04	----do-----	----do-----	Distilled spirit vinegar, colored.
4659	4.43	3.81	.26	Large precipitate-----	Very dark-----	Apple cider vinegar.
4660	4.21	3.72		----do-----	----do-----	do.
4661	3.11	.25	.36	No precipitate-----	No change-----	Distilled spirit vinegar.

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4662	Vinegar, Malt O. K.-----	Alart & McGuire, New York----	The Armfield Co., Fayetteville, N. C.
4663	Vinegar, Old Homestead, Distilled, Colored.	Old Homestead Mfg. Co., Richmond, Va.	J. H. Wishart, Lumberton, N. C.
4677	Vinegar -----	Burr Mfg. Co., Richmond, Va. --	E. J. Baggett, Red Springs, N. C.
4690	Vinegar, Cider -----	The Michaux Grocery Co., Goldsboro, N. C.	Pittman Bros., Goldsboro, N. C.
4691	Vinegar, Monarch Cider-----	D. J. Gregory, Richmond, Va.---	H. A. Powell Grocery Co., Goldsboro, N. C.
4692	Vinegar, Apple Cider-----		W. M. Smith, Goldsboro, N. C. --
4693	Vinegar -----		do-----
4705	Vinegar, Extra, French-----	L. A. Preie, Bordeaux, France --	Clarence Sawyer, Asheville, N. C.
4706	Vinegar, Malt, Grimble -----	Grimble & Co., Cumberland Market, London.	do-----
4707	Vinegar, Malt, Heinz-----	H. J. Heinz Co., Pittsburg, Pa.---	do-----
4708	Vinegar, Apple, Heinz -----	do-----	do-----
4709	Vinegar, Malt, Heinz-----	do-----	do-----
4710	Vinegar, Tarragan -----	Crosse & Blackwell, Soho Sq., London.	do-----
4711	Vinegar, Malt-----	do-----	do-----
4712	Vinegar, Duffy's Apple Cider.	American Fruit Product Co., Rochester, N. Y.	do-----
4713	Vinegar, Hazzard's Malt, Distilled.	E. C. Hazzard Co., New York---	do-----
4714	Vinegar, Cider, Rhododendron.	R. Guastavino, Black Mountain, N. C.	Noland-Roland Grocery Co., Asheville, N. C.
4715	do-----		do-----
4838	Vinegar, Distilled Spirits‡ --		The Haynes Bottling Works, Rutherfordton, N. C.
4412	do‡ -----		Chas' F. Cates, Mebane, N. C. ---
4121	Vinegar, Golden Rod‡ -----	Kirk-Shelly Vinegar Co., Richmond, Va.	Southern Pure Food Co., Durham, N. C.
4598	Vinegar, Distilled, No. 1002‡	A. F. Calahan & Co., Chicago, Ill.	Norton Vinegar and Cider Co., Statesville, N. C.
4849	do‡ -----	D. J. Gregory Vinegar Co., Richmond, Va.	Townsend & Thrower, Red Springs, N. C.
4858	Vinegar, Cider‡ -----		M. C. Godwin & Co., Pine Level, N. C.
4904	Vinegar, Cider -----	Hirsch Bros. & Co., Louisville, Ky.	C. Sawyer, Asheville, N. C.
5054	do-----	do-----	do-----
5060	Vinegar, Apple Cider, Elko --	O. L. Gregory Vinegar Co., Paducah, Ky.	J. G. Ball, Raleigh, N. C. -----
5071	Vinegar, Apple Cider, White House.	The Virginia Cider and Vinegar Co., Winchester, Va.	Raleigh Produce Co., Raleigh, N. C.
5072	Vinegar, Elko-----	O. L. Gregory Vinegar Co., Paducah, Ky.	do-----
5073	Vinegar, Blue Grass Bell ---	Jones Bros. & Co., Louisville, Ky.	do-----
5074	Vinegar, Family-----	Semmes Board Co., Washington, D. C.	do-----
5169	Vinegar, Crab-apple -----	Asheville Bottling Works, Asheville, N. C.	
5170	Vinegar, Apple Cider -----		E. J. Baggett, Red Springs, N. C.
5171	Vinegar, Blue Grass Bell-----	Jones Bros. & Co., Louisville, Kv.	

†Party who sent sample to the Department for analysis.

‡Samples sent to the Department by local dealers or others for analysis.

TION OF VINEGAR—CONTINUED.

Laboratory Number.	Total Acidity (Acetic Acid) Per Cent.	Total Solids— Per Cent.	Ash—Per Cent.	Lead Subacetate.	Sodium Bicarbonate.	The indications are that this is—
4662	4.62	.21	.02	No precipitate -----	No change -----	Distilled spirit vinegar, col- ored, misbranded.
4663	4.23	.21	.03	---do -----	---do -----	Distilled spirit vinegar, col- ored, containing a little malt, misbranded.
4677	4.67	.31	.06	---do -----	---do -----	Distilled spirit vinegar, col- ored.
4690	4.18	.63	.06	Slight precipitate ----	Slightly dark -----	Compound vinegar, mis- branded.
4691	4.32	2.03	.20	Precipitate -----	Dark -----	Apple cider vinegar.
4692	.92	.36	.05	-----	-----	Not vinegar, misbranded.
4693	3.81	1.51	.30	Precipitate -----	Dark -----	Apple cider vinegar, below standard.
4705	6.42	.32	.07	No precipitate -----	No change -----	Distilled spirit vinegar.
4706	4.43	2.08	.23	Precipitate -----	Slightly darker -----	Malt vinegar.
4707	6.20	2.66	.18	---do -----	---do -----	do.
4708	5.70	2.52	.21	---do -----	Very dark -----	Apple cider vinegar.
4709	5.80	2.26	.22	---do -----	Slightly darker -----	Malt vinegar.
4710	5.64	2.49	.37	---do -----	---do -----	Malt vinegar, Tarragan.
4711	5.60	1.96	.24	---do -----	---do -----	Malt vinegar.
4712	5.01	3.30	.41	---do -----	Dark -----	Apple cider vinegar.
4713	5.50	.12	.03	No precipitate -----	No change -----	Distilled vinegar, misbrand- ed. Is not a malt vinegar.
4714	4.03	1.97	.11	Precipitate -----	Very dark -----	Apple cider vinegar.
4715	3.16	.89	.08	Very small precipitate	No change -----	Malt vinegar, below stand- ard.
4838	4.01	.31	-----	No precipitate -----	---do -----	Distilled spirit vinegar, col- ored.
4412	8.80	.16	-----	---do -----	---do -----	Distilled spirit vinegar.
4121	4.96	3.57	.36	Precipitate -----	Very dark -----	Apple cider vinegar.
4593	4.38	.14	.02	No precipitate -----	No change -----	Distilled spirit vinegar, col- ored.
4849	4.67	2.15	.35	Precipitate -----	Dark -----	Apple cider vinegar.
4858	3.70	1.96	.31	---do -----	---do -----	Apple cider vinegar, below standard.
4904	4.67	2.91	.32	---do -----	Very dark -----	Apple cider vinegar.
5054	4.63	2.77	.34	---do -----	---do -----	do.
5060	4.28	2.31	.33	---do -----	Dark -----	do.
5071	4.77	1.74	.23	---do -----	No change -----	Compound vinegar.
5072	4.60	2.29	.32	---do -----	Dark -----	Apple cider vinegar.
5073	4.17	1.89	.26	---do -----	Very dark -----	do.
5074	4.03	.17	.02	No precipitate -----	No change -----	Distilled spirit vinegar, col- ored.
5167	4.23	1.26	.06	---do -----	---do -----	do.
5170	4.86	.23	.03	---do -----	---do -----	do.
5171	4.28	1.90	-----	Precipitate -----	Very dark -----	Apple cider vinegar.

COFFEE, COFFEE COMPOUNDS AND IMITATION COFFEE.

Coffee is the seed of a small tree whose flesh-fruit is about the size of a cherry and contains two seeds, which, when freed from the pulp and enveloping membrane, are the coffee beans of commerce.

Roasted coffee is coffee which by the action of heat has become brown, developed its characteristic aroma and contains not less than 10 per cent of fat and not less than 3 per cent of ash.

Six samples of coffee, coffee compounds and coffee substitutes were examined, two of which, under the labels they bore, were classed as adulterated. They were labeled and sold as coffee, though they contained substances other than coffee, without the fact being stated on the labels.

RESULTS OF THE EXAMINATION OF COFFEES,

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4524	Coffee, Old Homestead, absolutely pure.	Old Homestead Coffee Co., Richmond, Va.	Dr. W. J. McAnaly, High Point, N. C.
4672	Coffee and Chicory, Luzianne, Mocha & Java.	Reily, Taylor & Co., New Orleans, La.	H. W. Hill, Sanford, N. C.-----
5076	Coffee, Luzianne, Mocha & Java.	-----do-----	R. E. Lain, Laurinburg, N. C.---
5174	Health Coffee, Dr. Shoop's Cereals, Nuts, etc.	Dr. Shoop, Racine, Wis.-----	Townsend & Thrower, Red Springs, N. C.
5228	Coffee, White House -----	Dwinell-Wright Co., Boston, Mass.	W. B. Mann, Raleigh, N. C.-----
5229	Coffee, Our Leader-----	Edwin J. Gillies, New York-----	G. S. Terrell, Raleigh, N. C.-----

PHOSPHATES.

Phosphates are usually prepared from the same syrups, flavors, etc., as soda waters, except they contain acid phosphates. The same adulterants are found in them that are found in the soda waters, and the

RESULTS OF THE EXAMI

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4699	Phosphate*-----	Oklahoma Vinegar Co.-----	Holly Springs Land and Improvement Co., Holly Springs, N. C.
4718	Phosphate, Mezzo*-----	Anderson & Co., Atlanta, Ga.---	E. Moffitt, Ashboro, N. C.-----
4859	-----do*-----	-----do-----	B. C. Beckwith, Raleigh, N. C.---
4860	-----do*-----	-----do-----	-----do-----
4881	Phosphate*-----	-----	Piedmont Grocery Co., Hickory, N. C.
4868	Phosphate, Cherry -----	Haynes Bottling Works, Rutherfordton, N. C.	Haynes Bottling Works, Rutherfordton, N. C.
5013	Phosphate, Royal Crown ----	C. Valaer Bottling Works, Charlotte, N. C.	Wm. Aberham, Charlotte, N. C.---

* Samples sent to the Department by local dealer or others for analysis.

† Party who sent sample to the Department for analysis.

No. 4524, "Old Homestead Coffee," was composed entirely of ground roasted cereals, and contained no coffee at all. No. 4672 was branded "Roasted Coffee, Luzianne, Mocha and Java." It was composed of coffee and chicory, and the presence of the latter not being shown on the label, under the Food Law, is an adulterant. No. 5076 was branded "Roasted Coffee, Luzianne, Mocha and Java," but in small print over another part of the label the presence of the chicory was shown. As the presence of chicory in this sample was shown, though it was stamped over another part of the label, it is not classed as adulterated, but as misbranded and not properly labeled. No. 5174 was branded "Shoop's Health Coffee," but the fact that it contains no coffee at all was stated in plain type immediately below the word "coffee." As it contains no coffee, this product should be branded "Imitation Coffee" or "Coffee Substitute."

COFFEE COMPOUNDS AND COFFEE SUBSTITUTES.

Laboratory Number.	Composed Principally of—	Fat—Per Cent.	Ash—Per Cent.	Adulterants.	Remarks.
4524	Roasted cereals -----			Roasted cereals -----	Misbranded, contains no coffee at all.
4672	Coffee and chicory -----	8.30	4.45		Not Mocha and Java, misbranded.
5076	----do -----	8.45	4.32	Chicory-----	Not properly labeled, not Mocha and Java.
5174	Roasted cereals and nuts -----				Not properly labeled, misbranded.
5228	Roasted coffee -----	10.48	4.28		
5229	----do -----	10.03	4.25		

requirements of the Food Law that apply to the latter also apply to phosphates.

Seven samples of phosphates were examined; five, or more than 71 per cent, of which were found to be adulterated. The adulterants found were benzoic acid, saccharine and coal-tar dye.

NATION OF PHOSPHATES.

Laboratory Number.	Alcohol—Per Cent. by Vol.	Adulterants.		Remarks.
		Preservatives.	Coloring Matter.	
4699	0.10 Benzoic acid -----			
4718	0.10 ----do -----			
4859	0.00 None found -----			
4860	0.00 ----do -----			
4831	6.70 Benzoic acid -----			
4868	None found -----		Coal-tar dye -----	Artificial cherry flavor.
5013	Saccharine -----		----do -----	Not properly labeled.

BOTTLED SODA WATER.

The sale and use of bottled soda waters in the State is getting to be enormous. Almost every town has one or more bottling plants for bottling soda water and other soft drinks. However, it is not the extent of the business that is alarming. It is the adulteration, misbranding, etc., that is practiced by some of the bottlers. The tendency is to use artificial flavors and coal-tar colors in the manufacture of these goods and label them as pure fruit products, often showing on the label an attractive-looking picture of the fruit from which the goods are supposed to be made.

Some of the manufacturers of these flavors and syrups from which these soda waters are made have insisted that their artificial products were fruit products, and, therefore, could be labeled and sold as such. If these flavors or syrups contain any artificial flavoring or coloring

RESULTS OF THE EXAMINATION OF BOTTLED SODA WATERS

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4361	Soda Water, Orange -----	Haynes Bottling Works, Rutherfordton, N. C.	Haynes Bottling Works, Rutherfordton, N. C.
4363	Soda Water, West Indies Lemon Sour.	do -----	do -----
4364	Soda Water, Cream -----	do -----	do -----
4365	Soda Water, Chocolate Cream -----	do -----	do -----
4366	Root Beer -----	do -----	do -----
4367	Soda Water, Strawberry -----	do -----	do -----
4369	Soda Water, Sarsaparilla -----	do -----	do -----
4372	Soda Water, Peach, Mellow -----	do -----	do -----
4374	Soda Water, Pineapple -----	do -----	do -----
4375	Ginger Ale, Cascade -----	do -----	do -----
4376	Egg Nog (imitation) -----	do -----	do -----
4377	Soda Water, Lemon -----	do -----	do -----
4378	Carbonated Beverage, Koca-Nola.	Koca-Nola Co., Atlanta, Ga.	do -----
5010	Carbonated Beverage, Peach Nips.	American Beverage Co., Atlanta, Ga.	Carolina Beverage Co., Charlotte, N. C.
5011	Carbonated Beverage, U-No.	Schnapps Bottling Co., Charlotte, N. C.	Wm. Aberham, Charlotte, N. C.
5012	Soda Water, Lemon Sour (artificial).	Carolina Beverage Co., Charlotte, N. C.	do -----
5014	Carbonated Beverage, Pepsi-Cola.	Pepsi-Cola Co., New Bern, N. C.	Adams Grain and Provision Co., Charlotte, N. C.
5015	Carbonated Beverage, Coca-Cola.	Coca-Cola Co., Atlanta, Ga.	Wm. Aberham, Charlotte, N. C.
5022	Ginger Ale, Schnapps -----	E. H. Gaines, Gaffney, S. C.	Schnapps Bottling Co., Charlotte, N. C.

†Party who sent sample to the Department for analysis.

matter they must be regarded as artificial, imitation or compound products.

There is a tendency among the soda-water bottlers not to label their products at all. The rulings of the Board of Agriculture, under the Food Law, require that a label must be, as far as possible, attached to each package, and contain, in addition to other information, the name of the material, the name and address of the manufacturer or jobber.*

Another bad practice of many of the bottlers is the refilling of old bottles with labels bearing the name of other firms blown in the glass so that they cannot be removed. This practice is not only a violation of the Food Law, but is an infringement on the rights of others.

Fifty-four samples of soda waters were examined; thirty-three, or more than 61 per cent, of them were adulterated or misbranded, as is shown in the following table:

AND OTHER NON-ALCOHOLIC CARBONATED BEVERAGES.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
4861	None found -----	Coal-tar dye -----	
4863	----do -----	None found -----	Not properly labeled—West Indies is misleading.
4864	----do -----	----do -----	Not properly labeled—is not a cream soda.
4865	----do -----	----do -----	do.
4866	----do -----	----do -----	
4867	----do -----	Coal-tar dye -----	Not properly labeled—should be labeled artificial or imitation strawberry flavor.
4869	----do -----	None found -----	
4870	----do -----	Coal-tar dye -----	Not properly labeled—should be labeled artificial or imitation peach flavor.
4874	----do -----	----do -----	Not properly labeled—does not state what the material is.
4875	----do -----	None found -----	
4876	----do -----	Coal-tar dye -----	Not properly labeled—is not imitation egg nog. Label does not contain manufacturer's name.
4877	----do -----	None found -----	
4878	----do -----	----do -----	
5010	Saccharine -----	Coal-tar dye -----	Not properly labeled—artificial flavor and not so stated.
5011	None found -----	----do -----	
5012	----do -----	None found -----	
5014	----do -----	----do -----	
5015	----do -----	----do -----	
5022	----do -----	----do -----	

*See rulings on labelings.

RESULTS OF THE EXAMINATION OF BOTTLED SODA WATERS AND

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
5025	Carbonated Beverage -----	Crown Bottling Co., Gastonia, N. C.	Henry Rockett, Gastonia, N. C.--
5026	Ginger Ale, Carolina Beauty -----	Carolina Beverage Co., Charlotte, N. C.	-----do-----
5027	Carbonated Beverage -----	Gastonia Bottling Works, Gastonia, N. C.	-----do-----
5028	Carbonated Beverage, Digestol -----	Wharton Chemical Co., Nashville, Tenn.	Gastonia Bottling Works, Gastonia, N. C.
5029	Carbonated Beverage, Peach Mellow (artificial) -----	Blumenthal Bros., Philadelphia, Pa.	Carolina Beverage Co., Charlotte, N. C.
5031	Pepsi-Cola-----	Pepsi-Cola Co., New Bern, N. C.	Henry Rockett, Gastonia, N. C.--
5032	Coca-Cola -----	Coca-Cola Co., Atlanta, Ga. -----	-----do-----
5033	-----do-----	-----do-----	J. D. Boon, Waynesville -----
5030	Root Beer, Carbonated, Hires -----	Chas. E. Hires Co.-----	Crown Bottling Works, Gastonia, N. C.
5158	Carbonated Beverage, Strawberry. -----	Asheville Bottling Works, Asheville, N. C.	-----do-----
5041	Soda Water, Vanilla -----	H. S. Haskell, Asheville, N. C.	J. B. Schochet, Asheville, N. C. -
5042	Soda Water, Blood Orange-----	Asheville Bottling Works, Asheville, N. C.	S. H. Miller, Asheville, N. C. ----
5159	Soda Water, Peach-----	Norton Vinegar and Cider Co., Statesville, N. C.	-----do-----
5122	Soda Water, Lemon -----	Morganton Bottling Works, Morganton, N. C.	-----do-----
5123	Ginger Ale -----	-----do-----	-----do-----
5124	Soda Water, Vanilla -----	-----do-----	-----do-----
5125	Soda Water, Cream -----	L. A. Wolcott, Central City, W. Va.	Marion Bottling Works, Marion, N. C.
5135	Carbonated Beverage, Koca-Nola. -----	Koca-Nola Co., Atlanta, Ga. -----	-----do-----
5136	Soda Water, Lemon -----	Marion Bottling Works, Marion, N. C.	-----do-----
5137	Carbonated Beverage, Peach, Mellow. -----	-----do-----	-----do-----
4525	Carbonated Beverage, Apricola* -----	Apricola Co., Atlanta, Ga. -----	W. B. Douglass, Raleigh, N. C. --
4468	Root Beer -----	Coca-Cola Bottling Works, Wilson, N. C.	-----do-----
4382	Soda Water, Peach* -----	Norton Vinegar and Cider Co., Statesville, N. C.	Norton Vinegar and Cider Co., Statesville, N. C.
4888	Coca-Cola* -----	Coca-Cola Co., Atlanta, Ga. -----	J. D. Overton, Nashville, N. C. --
4898	Water, Carbonated* -----	-----do-----	Norton Vinegar and Cider Co., Statesville, N. C.
4901	Soda Water, Ro-Ra* -----	S. Cassler, Asheville, N. C. -----	S. Cassler, Asheville, N. C.
4903	Fruit Acid* -----	-----do-----	Norton Vinegar and Cider Co., Statesville, N. C.
5046	Soda Water* -----	Red Springs Mineral Water Co., Red Springs, N. C.	S. W. Wright, Red Springs, N. C.
5047	Soda Water, Rasport* -----	-----do-----	-----do-----
5048	Soda Water, Rasport* -----	-----do-----	-----do-----
5049	Soda Water, Syrup* -----	-----do-----	-----do-----
4716	Fruit Acid, Raspberry -----	Cross & Blackwell, Soho Square, London, England.	Noland-Roland Grocery Co., Asheville, N. C.
4621	Fruit Acid -----	Sol. Cassler, Asheville, N. C.-----	S. Cassler, Asheville, N. C. -----
5160	Soda Water, Grape Mist* -----	American Beverage Co., Atlanta, Ga.	Carolina Beverage Co., Charlotte, N. C.
5161	Soda Water, Limeade* -----	-----do-----	-----do-----

*Samples sent to the Department by local dealers and others for analysis.

†Party who sent sample to Department for analysis.

OTHER NON-ALCOHOLIC CARBONATED BEVERAGES—CONTINUED.

Laboratory Number.	Adulterants.		Remarks.
	Preservatives.	Coloring Matter.	
5025	Saccharine -----	Coal-tar dye -----	Improperly labeled—does not state what the material is.
5026	----do -----	None found -----	
5027	----do -----	Coal-tar dye -----	Not properly labeled—does not state what the material is.
5028	-----	----do -----	
5029	None found -----	----do -----	Not properly labeled—the word "artificial" should be in larger type.
5031	----do -----	None found -----	
5032	----do -----	----do -----	
5033	----do -----	----do -----	
5030	----do -----	----do -----	
5158	Saccharine -----	Coal-tar dye -----	Not properly labeled—does not name the product—artificial flavor.
5041	----do -----	----do -----	Artificial flavor.
5042	----do -----	----do -----	Artificial flavor.
5159	----do -----	----do -----	Not properly labeled—artificial peach flavor.
5122	None found -----	----do -----	Not properly labeled—artificial flavor product not named.
5123	----do -----	----do -----	
5124	----do -----	None found -----	
5125	----do -----	----do -----	Not properly labeled—not cream soda.
5135	----do -----	----do -----	
5136	----do -----	Coal-tar dye -----	Not properly labeled—artificial flavor.
5137	----do -----	----do -----	Not properly labeled—artificial peach flavor.
4525	----do -----	----do -----	
4468	Salicylic acid -----	----do -----	
4882	----do -----	None found -----	Artificial flavor.
4888	None found -----	----do -----	
4898	----do -----	----do -----	
4901	----do -----	----do -----	
4903	----do -----	----do -----	
5046	----do -----	Coal-tar dye -----	Artificial flavor.
5047	----do -----	----do -----	do.
5048	----do -----	----do -----	do.
5049	----do -----	None found -----	do.
4716	----do -----	----do -----	
4621	----do -----	----do -----	
5160	----do -----	Coal-tar dye -----	Artificial flavor—not properly labeled.
5161	----do -----	----do -----	do.

COLORING MATTERS.

The use of coal-tar dyes in foods and beverages offered for sale in North Carolina is a violation of the State Food Law.

Many soda-water bottlers and others use artificial coloring in their product. These coloring materials are usually bought for vegetable

RESULTS OF THE EXAMINATION OF COLOR

Laboratory Number.	Brand Name from Label.	Wholesaler or Manufacturer.
4902	Coloring, Vegetable, Red*-----	-----
4908	Coloring, Vegetable, Yellow*-----	-----
4909	Coloring, Vegetable, Red.-----	-----
4532	Coloring, Caramel*-----	-----
5162	Coloring, Yellow*-----	John M. Scott & Co., Charlotte, N. C.-----
5163	Coloring, Red*-----	Blumenthal Bros., Philadelphia, Pa.-----
4529	Coloring, Lemon*-----	-----

MALTS.

Only five samples of malt, all of which were sent to the Department for analysis, have been examined during the year. One sample was

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4465	Malt, Eureka, Canada*-----	Darley Park Brewery, Baltimore, Md.	C. L. W. Smith, Smithfield, N. C.--
4824	Malt*-----	Gottlieb Bauernschmidt-Straus Brewing Co., Baltimore, Md.	-----
4825	Malt*-----	do-----	-----
4894	Malt*-----	-----	Newsom Narren, Kenly, N. C.---
4895	Malt, Eureka, Canada*-----	Darley Park Brewery, Baltimore, Md.	O. J. Jackson, Faison, N. C.-----

* Sample sent to the Department by local dealers and others for analysis.

† Party who sent sample to the Department for analysis.

colors, but are often coal-tar dyes. Desiring to be sure of what they were using, a few of the manufacturers have sent samples of their coloring materials to the Department to be tested.

Seven samples of coloring matter were examined for this purpose, and all proved to be coal-tar dyes except one, which was caramel.

ING MATTERS USED IN FOOD PRODUCTS.

Laboratory Number.	Retail Dealer,†	Remarks.
4902	Norton Vinegar and Cider Co., Statesville, N. C.	Contained coal-tar dye.
4908	-----do-----	do.
4909	-----do-----	do.
4532	Koca-Nola Bottling Works, Gastonia, N. C.	Caramel.
5162	Geo. D. Everington, Laurinburg, N. C.	Contained coal-tar dye.
5163	-----do-----	do.
4529	Koca-Nola Bottling Works, Gastonia, N. C.	do.

found to be adulterated, containing salicylic acid. It also contained a small amount of sulphite, which, however, is allowed in fermented liquors.

MALTS AND IMITATION MALTS.

Laboratory Number.	Alcohol — Per Cent by Volume.	Solid Matter in Solution — Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4465	4.95	5.75	Salicylic acid -----	None found -----	Sulphites.
4824	0.90	2.45	None found -----	do -----	
4825	2.20	2.54	do -----	do -----	
4894	3.55	6.41	do -----	do -----	
4895	4.75	-----	do -----	do -----	

†Party who sent sample.

BEERS AND IMITATION BEERS.

Under the head of beers and imitation beers fifty samples were examined, only three of which were found to be adulterated. Two of the three contained salicylic acid and the other contained coal-tar dye.

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4519	Beer, Imitation, Vim*-----	Haynor Mfg. Co., Norfolk, Va.	J. A. Spence, Raleigh, N. C.----
4520	----do-----	-----do-----	Dock Haywood, Raleigh, N. C.----
4534	Beer, Tivoli, Hofbrau*-----	Robert Portner Brewing Co., Alexandria, Va.	R. E. Lewis, Raleigh, N. C.-----
4535	Beer, Tivoli, Vienna Cabinet*-----	-----do-----	-----do-----
4536	Beer, Tivoli, Extra Pale*-----	-----do-----	-----do-----
4596	Beer, Tivoli, Hofbrau*-----	-----do-----	Dispensary, Raleigh, N. C.-----
4599	Beer, Noxali*-----	Burr Mfg. Co., Richmond, Va.	B. F. Sparger, Mt. Airy, N. C.----
4614	Beer, Imitation*-----	Robert Portner Brewing Co., Alexandria, Va.	G. L. Smith, Hope Mills, N. C.----
4616	Beer, Imitation, Hop Brew*-----	E. Dannenberg Bottling Co., Wilson, N. C.	Wilson Grocery Co., Wilson, N. C.----
4646	Beer, Imitation, Beerine*-----	-----do-----	S. T. Boon, Fayetteville, N. C.----
4648	Beer, Imitation, Vim*-----	Haynor Mfg. Co., Norfolk, Va.	E. B. Jackson, Plymouth, N. C.----
4649	Beer, Imitation, Lar Bar*-----	Armfield Co., Fayetteville, N. C.	S. H. McRae, Fayetteville, N. C.----
4645	Beer, Imitation, Beerine*-----	-----do-----	L. J. Taylor, New Bern, N. C.-----
4652	Beer, Imitation, Lar Bar*-----	Armfield Co., Fayetteville, N. C.	S. H. McRae, Fayetteville, N. C.----
4654	Beer, Imitation, Cincinnati*-----	E. Dannenberg, Wilson, N. C.	E. J. Holt, Smithfield, N. C.-----
4655	Beer, Imitation, Lar Bar*-----	Armfield Co., Fayetteville, N. C.	S. H. McRae, Fayetteville, N. C.----
4840	----do-----	-----do-----	-----do-----
4842	Beer, Imitation, Cincinnati*-----	E. Dannenberg, Wilson, N. C.	E. J. Holt, Smithfield, N. C.-----
4700	Beer, Imitation, Jack Frost*-----	Apex Bottling Works, Apex, N. C.	J. R. Morris, Apex, N. C.-----
4701	----do-----	-----do-----	-----do-----
4702	Beer, Imitation, Cuban Ade*-----	-----do-----	-----do-----
4703	Beer, Imitation, Beerine*-----	Crown Bottling Works, New Bern, N. C.	C. W. Taylor, New Bern, N. C.----
4749	Beer, Imitation, Hop Ale*-----	American Beverage Co., Atlanta, Ga.	W. B. Douglass, Raleigh, N. C.----
4841	Beer, Imitation, Lar Bar*-----	Armfield Co., Fayetteville, N. C.	S. H. McRae, Fayetteville, N. C.----
4812	Beer, Imitation, Cuban Ade*-----	E. Dannenberg, Wilson, N. C.	L. F. Ormond, Goldsboro, N. C.----
4826	Beer, Imitation, Hop Ale*-----	American Beverage Co., Atlanta, Ga.	Carolina Beverage Co., Charlotte, N. C.
4832	Beer, Imitation*-----	-----do-----	O. B. Garren, Saluda, N. C.-----
4835	Beer, Imitation, Hop Ale*-----	American Beverage Co., Atlanta, Ga.	Carolina Beverage Co., Charlotte, N. C.
5051	----do-----	-----do-----	-----do-----
4836	----do-----	-----do-----	E. J. Holt, Smithfield, N. C.-----

* Sample sent to the Department by local dealers and others for analysis.

† Party who sent sample to the Department for analysis.

Much the greater number of samples examined under this head belong to the imitation class. Like imitation ciders, on account of their sale in territories where the sale of alcoholic beverages is illegal, many of these samples were sent to the Department for the determination of alcohol contained or supposed to be contained, by city officials or other citizens of the State. Very little adulteration was found, and the amount of alcohol contained was usually low.

BEERS AND IMITATION BEERS.

Laboratory Number.	Alcohol, Per Cent by Volume.	Solid Matter in Solution, Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4519	4.05	-----	None found	None found	
4520	4.00	-----	do	do	
4534	4.30	4.59	do	do	
4535	3.95	4.72	do	do	
4536	3.85	4.75	do	do	
4596	4.00	4.70	do	do	Sulphites.
4599	3.55	5.83	do	do	do,
4614	4.90	3.92	do	do	
4616	4.30	5.42	do	do	
4646	0.65	-----	Salicylic acid	do	
4648	3.70	5.35	None found	do	
4649	1.20	2.40	do	do	
4645	0.65	1.67	Salicylic acid	do	
4652	1.20	2.40	None found	do	
4654	1.60	1.85	do	do	
4655	0.95	2.40	do	do	
4840	1.10	2.40	do	do	
4842	1.65	1.80	do	do	
4700	0.05	1.74	do	do	
4701	0.55	1.85	do	do	
4702	0.15	6.30	do	Coal-tar dye	
4703	0.40	4.01	do	None found	
4749	0.25	-----	do	do	
4841	1.15	2.35	do	do	
4812	2.30	3.95	do	do	
4826	0.70	2.08	do	do	
4832	3.75	3.37	do	do	
4835	0.40	2.08	do	do	
5051	-----	-----	do	do	
4836	-----	-----	do	do	

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4505	Beer, Imitation, Hop Ale*	American Beverage Co., Atlanta, Ga.	W. B. Douglass, Raleigh, N. C.--
4522	---do-----	do-----	do-----
4650	---do-----	do-----	do-----
4855	Beer, Imitation, Hop Brew*	E. Dannenberg, Wilson, N. C.--	A. Farmer, Wilson, N. C.-----
4856	---do-----	do-----	E. Dannenberg, Wilson, N. C.-----
4857	---do-----	do-----	Teiser Fruit and Produce Co., Wilson, N. C.
4879	Beer, Imitation, Beerine*	Asheville Bottling Works, Asheville, N. C.	Asheville Bottling Works, Asheville, N. C.
4880	Beer, Tivoli*	Robert Portner Brewing Co., Alexandria, Va.	W. C. Hammer, Ashboro, N. C.--
4887	Beer, Imitation, Hop Brew*	E. Dannenberg Bottling Co., Wilson, N. C.	J. D. Overton, Nashville, N. C.--
4893	Beer, Imitation*	Home Brewing Co., Richmond, Va.	Newsom & Narren, Kenly, N. C.--
4910	Beer, Imitation, Cuban Ade*	E. Dannenberg, Goldsboro, N. C.	Troy Vann, Fayetteville, N. C. --
4911	Beer, Imitation*	Gottlieb Bauernschmidt-Straus Brewing Co., Baltimore, Md.--	do-----
5055	Beer, Champagne, Rosenegk's.*	Rosenegk Brewing Co., Richmond, Va.	W. F. Young, Princeton, N. C.---
5056	Beer, Imitation, Hop Brew*	Dannenberg Bottling Co., Wilson, N. C.	do-----
5153	Beer, Imitation, Cuban Ade*	Dannenberg Bottling Co., Goldsboro, N. C.	Junius B. Lee, Four Oaks, N. C.--
4530	Beer, Imitation, Hop Brew*	Home Brewing Co., Richmond, Va.	Dannenberg Bottling Co., Wilson, N. C.
4531	---do-----	do-----	do-----
4997	Beer, Imitation, Hop Ale*	American Beverage Co., Atlanta, Ga.	W. B. Douglass, Raleigh, N. C.--
4862	Beer, Imitation, Jack Frost*	Haynes Bottling Works, Rutherfordon, N. C.	Haynes Bottling Works, Rutherfordon, N. C.
5102	Beer, Vim*	Haynor Mfg. Co., Norfolk, Va.	A. L. Eakir, Durham, N. C.-----

WINES.

Only two samples of wine were examined. They were domestic

RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4896	Wine, Blackberry, Old North State, Garrett's*	Paul Garrett & Co., Norfolk, Va.	P. A. Thompson, Winston, N. C.--
4897	Wine, Blackberry, Bear's*	Sol. Bear & Co., Wilmington, N. C.	do-----

*Samples sent to the Department by local dealers and others for analysis.

†Party who sent sample to the Department for analysis.

BEERS AND IMITATION BEERS—CONTINUED.

Laboratory Number.	Alcohol, Per Cent by Volume.	Solid Matter in Solution, Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4505	0.75		None found -----	None found -----	
4522	0.40		---do-----	---do-----	
4650	0.30	1.16	---do-----	---do-----	
4855	0.70		---do-----	---do-----	
4856	1.70		---do-----	---do-----	
4857	1.70		---do-----	---do-----	
4879	0.35		---do-----	---do-----	Not properly labeled.
4880	4.80	4.24	---do-----	---do-----	
4887	1.80	3.24	---do-----	---do-----	
4893	4.00	5.50	---do-----	---do-----	Not labeled.
4910	1.85	2.21	---do-----	---do-----	
4911	3.90	4.71	---do-----	---do-----	
5055	2.60	6.02	---do-----	---do-----	
5056	1.82	3.20	---do-----	---do-----	
5153	1.75	2.72	---do-----	---do-----	
4530	3.50	1.74	---do-----	---do-----	
4531	1.65	1.72	---do-----	---do-----	
4697	0.30	1.17	---do-----	---do-----	
4862			---do-----	---do-----	
5192	3.40	3.75	---do-----	---do-----	

blackberry wines, and no adulteration was found in either sample.

NATION OF WINES.

Laboratory Number.	Alcohol—Per Cent by Vol.	Solid Matter in Solution—Per Cent.	Adulterants.		Remarks.
			Preservatives.	Coloring Matter.	
4896	15.90	18.05	None found -----	None found -----	Blackberry wine.
4897	12.55	21.07	---do-----	---do-----	do.

DISTILLED LIQUORS.

Six samples of distilled liquors were examined, all of which were sent to the Department for analysis. Four of the samples proved to

RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.
4523	Whiskey, Corn* -----	-----	F. P. Rhyne, Hudson, N. C.-----
4704	Whiskey*-----	-----	J. P. Burns, Hickory, N. C.-----
5061	Whiskey, Rye* -----	-----	Lucama Dispensary, Lucama, N. C.
5062	Whiskey, Rye* -----	-----	do-----
5063	Gin*-----	-----	do-----
5064	Gin*-----	-----	do-----

TONICS.

These samples, four in number, all contained alcohol except one, ranging from 8.20 per cent to 26.80 per cent. They were examined

RESULTS OF THE DETERMINATION OF ALCOHOL AND EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.†
4695	Tonic, Smiley's Vegetable Compound.*	Smiley Cure Co., Raleigh, N. C.-----	-----
5052	Tonic, Chill Killer*-----	-----	J. C. Correll, Concord, N. C.-----
5175	Tonic, Buebu*-----	Haynor Mfg. Co., Norfolk, Va.---	E. L. Davis, Rocky Mount, N. C.-
4656	Tonic, Kuidine*-----	Mountain Iron Mineral Co., Spartanburg, S. C.	Ford, Whisnant & Co., Hickory, N. C., R. F. D.

*Samples sent to the Department by local dealer or other persons for analysis.

†Or party sending sample to the Department for analysis.

be imitation or artificial whiskeys and two were gins. The amount of alcohol contained in them was low, being very much below proof.

The subject of distilled liquors was treated at length in the Seventh Food Report of the Department, published December, 1906.

ANALYSIS OF DISTILLED LIQUORS.

Laboratory Number.	Alcohol— Per Cent by Vol.	Solid Matter in Solution— Per Cent.	Proof.	Remarks.
4523	38.30	0.07	76.00	Imitation or artificial whiskey.
4704	28.70	3.81	57.00	Imitation or artificial whiskey, containing water and sugar.
5061	37.40	0.14	74.00	Imitation or artificial whiskey.
5062	32.40	0.15	64.00	do.
5063	37.40	0.06	74.00	Gin.
5064	36.50	0.06	72.50	do.

for chemical preservatives and coal-tar dyes, with negative results. No effort was made to determine or even detect the medicinal constituents.

ANALYSIS FOR PRESERVATIVES AND COLORING MATTER IN TONICS.

Laboratory Number.	Alcohol— Per Cent by Volume.	Adulterants.		Remarks.
		Preservatives.	Coloring Matter.	
4695	8.20	None found	None found	No effort was made to determine or even detect the medicinal properties.
5052	17.65	do	do	do.
5175	26.80	do	do	do.
4556	do	do	do	do.

CHEMICAL PRESERVATIVES SOLD UNDER TRADE OR PROPRIETARY NAMES.

The extensive use of antiseptics or chemical preservatives in foods and beverages is an evil that has for the past few years demanded the attention of food officials.

The knowledge that we have of the effect of these preservatives on digestion and health tends to show that they are deleterious and that their effect on the health of the consumer depends upon the quantity and frequency of the dose.

An investigation by the Bureau of Chemistry, United States Department of Agriculture, has shown conclusively that the use in foods of at least three of these chemical preservatives, viz., boric acid or borates, salicylic acid or salicylates, sulphurous acid or sulphites, is deleterious and dangerous to health.

The investigation showed that boric acid or borates, when taken into the body with food to the amount of four or five grains per day, continued for some time, results in most cases in loss of appetite and a feeling of fullness and uneasiness in the stomach, which in some cases results in nausea, with a general tendency to produce a dull and persistent headache.

Regarding salicylic acid, the investigation showed that it is, when used in foods, at first a stimulant, increasing the solubility and absorption of food elements from the alimentary canal. It soon, however, loses its stimulating effect and becomes a depressant, tending to break down the tissues faster than they are rebuilt, to diminish the weight of the body and in some cases to result in illness.

The results of the investigation were very decidedly unfavorable

RESULTS OF THE EXAMINATION OF PATENT OR PROPRIETARY ERAGE IS A VIOLATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4749	Special M. Preservaline -----	Preservaline Mfg. Co., New York -----
4722	Preservaline, Composit No. 2 -----	do -----
4723	Liquid Smoke -----	do -----
4724	Preservaline -----	do -----
4725	do -----	do -----
4726	Preservaline B. -----	do -----
4727	Freezine -----	B. Heller Co., Chicago, Ill. -----
4728	Iceine -----	The Heller Chemical Co., Chicago, Ill. -----
4729	Rex Magnus -----	-----

to the use of sulphurous acid in any quantity or for any period of time, and showed the desirability of avoiding the use of it in products intended to be used for human food.

With a few exceptions, the State Food Law prohibits the use of chemical preservatives in food products offered for sale in North Carolina.

The National Meat Inspection Law provides that no meat or meat-food product containing any chemical preservative can be shipped from one State into another, and the National Food Law is rapidly preventing the use of chemical preservatives in foods in interstate commerce.

As the use of chemical preservatives in food has fallen into disfavor and has become a violation of many of the food laws of the country, these preservatives are being offered to the trade under proprietary names, or names by which their constituents are not recognized, as "Preservaline," "Iceine," "Freezine," "Freez-Em," "Froz-Em," "Fröstine," "Refrigerine," etc. By selling them under trade or proprietary names and claiming that they are harmless and contain nothing the use of which in food is a violation of the law, manufacturers are not only able to continue to sell these preservatives, but to sell them at a price several times greater than the market value of their chemical constituents.

Thirty-one of these proprietary preservatives have been examined, and, without an exception, were found to contain some one or more chemical preservatives, the use of which in food is a violation of the law.

The names of those examined, the results of the examination and the claims made for them by the manufacturers are given in the following table:

CHEMICAL PRESERVATIVES, THE USE OF WHICH IN FOOD OR BEV-
OF THE FOOD LAW.

Laboratory Number.	Claims made by Manufacturers Regarding their Proprietary Preservatives.	Composed Principally of the Following:
4749	The greatest and only scientific preservative for milk and cream.	Weak solution of formaldehyde.
4722	Non-poisonous, a new scientific discovery-----	Solution of formaldehyde.
4723	Takes the place of smoking meat-----	Formaldehyde and product from destructive distillation of wood.
4724	The greatest American food preservative-----	Borax and boric acid.
4725	The greatest preservative for keeping cider, grape juice, etc.	Benzoate of soda.
4726	The best preservative for all kinds of food substances.	Borax and boric acid.
4727	The only scientific milk and cream preservative.	Weak solution of formaldehyde.
4728	A wonderful discovery for keeping milk and cream.	do.
4729	Preservative for milk and cream-----	Borax and boric acid.

RESULTS OF THE EXAMINATION OF PATENT OR PROPRIETARY
BEVERAGE IS A VIOLATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
4730	Cream Preserver, Pearl Brand -----	-----
4731	M. Preservaline -----	Preservaline Mfg. Co., New York -----
4732	B. B. Preservaline -----	do -----
4733	Preservaline Butter Powder -----	do -----
4734	Cream Albuminoid -----	do -----
4736	Blue Seal Preservative -----	Blue Seal Extract Co., Boston, Mass. -----
4737	Preservite -----	Otto Hann & Bro., New York -----
4738	Forman's Wine Preservative -----	-----
4739	Compressed Preserving Powder -----	William Zinsser & Co., New York -----
4740	Patent Antacide Tablets -----	E. J. Beggs & Co., New York -----
4741	Eimken's Preserving Cakes -----	New York Malt Roasting Co., New York -----
4742	K. M. S. Preserving Powder -----	Rudolph Schneider -----
4743	Rex Magnus, Viandine -----	-----
4744	Rex Magnus, Ocean Wave -----	-----
4745	Rex Magnus -----	-----
4746	Freez-Em -----	The B. Heller Chemical Co., Chicago, Ill. -----
4813	Liebig's Konserver -----	-----
4814	Refrigerine -----	-----
4815	Frostein -----	-----
4816	Froz-Em -----	-----
4817	Fungicide -----	Douglass Filter and Specialty Co., Albany, N. Y. -----
4818	Hyper-Samphire -----	-----

CHEMICAL PRESERVATIVES, THE USE OF WHICH IN FOOD OR OF THE FOOD LAW—CONTINUED.

Laboratory Number.	Claims made by Manufacturers Regarding their Proprietary Preservatives.	Composed Principally of the Following.
4730	For milk and cream use Pearl Brand Cream Preserver.	Borax, boric acid and salt.
4731	For milk and cream use M. Preservaline -----	Boric acid and sodium bicarbonate.
4732	Preservative especially for creamery use -----	Borax, boric acid and salt.
4733	Preservative Butter Powder makes churning easy, removes unpleasant taste.	Bicarbonate of soda and small amount borax.
4734	Cream Albuminoid keeps cream fresh and sweet for 5 to 7 days.	Proteids dissolved in water and borax.
4736	Blue Seal Preservative is the best preservative for all foods.	Boric acid and salicylic acid.
4737	Preservite is the best preservative for cider ---	Benzoate of soda.
4738	Forman's Wine Preservative is the very best ---	About 35 per cent solution of formaldehyde.
4739	Compressed Preserving Powder for beer-----	Salicylic acid and saccharine.
4740	Antacide Tablets for preserving beer are guaranteed to be perfectly harmless-----	Sodium salicylate, salicylic acid, carbonate of soda and salt.
4741	-----	Salicylic acid, salicylate of soda and sugar.
4742	-----	Sulphite of soda, sulphate of soda and large amount of sugar.
4743	Preservative for meats, poultry, fish and game -	Borax, boric acid and salt.
4744	For oysters, clams and all sea foods-----	Borax, boric acid and salt.
4745	For sausage -----	Sulphite of soda, carbonate of soda and salt.
4746	When Freez-Em is used all pieces of meat can be used in sausage and Hamburg steak.	Sulphite of soda and salt.
4813	The best preserver for all kinds of meats-----	Boric acid, salicylic acid.
4814	-----	Sodium sulphite and salt.
4815	-----	Sodium sulphite and salt.
4816	-----	Borax, boric acid and sulphite of soda.
4817	A perfect antiferment for cider and sweet wines, free from salicylic acid.	Sodium benzoate, sodium bicarbonate and starch.
4818	Egg preservative-----	Salt in excess, salicylic acid, sulphite of soda, sulphate of lime.

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